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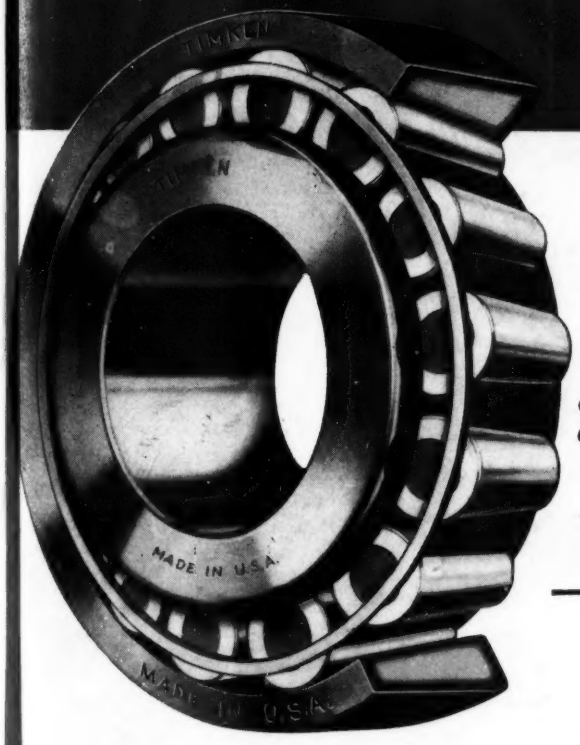

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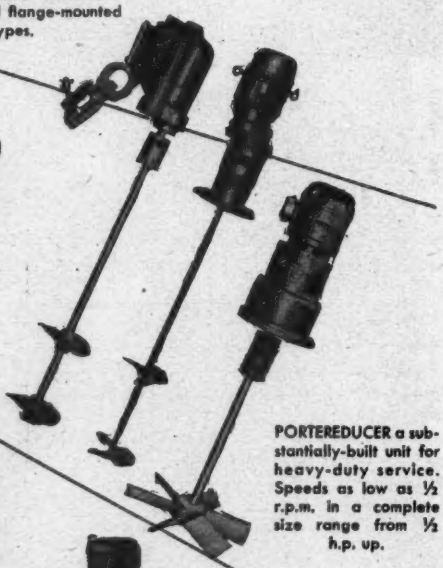

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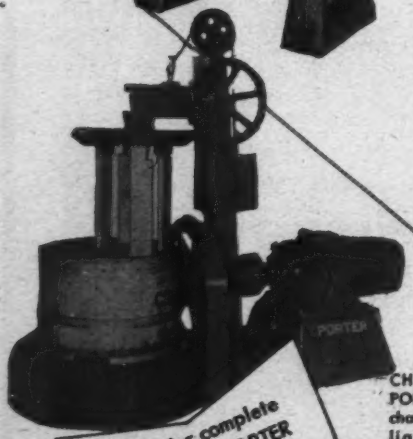

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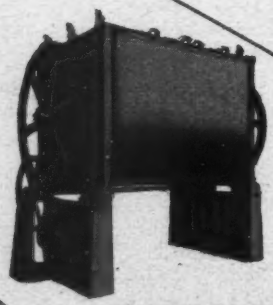

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National Gas Policy

THE sale of the Big Inch and the Little Big Inch lines for natural-gas transmission gives added support to those who see in the developments of the past year the necessity of producers, transporters, and distributors formulating policies which reflect adequately the fact that natural gas has become "big business."

It is true that consideration has been given to natural gas by those who are establishing sound postwar petroleum programs—inevitably oil and natural gas overlap and intermingle in every phase of operations. But the large expansion in the utilization of natural gas and its distinctive operating techniques necessitate the adoption of policies based on new conditions.

As regards consumers they are alert to the superiority of natural gas as fuel. It is no secret that the opposition of coal and railroad interests—strong a year ago—to the conversion of the big war lines to natural-gas transmission weakened when eastern consumers let it be known in terms that could be understood politically that they want gas fuel. It is of interest in this connection that in areas where there are now no natural-gas systems, the desire for gas service often emanates from the use of liquefied gas.

The same situation applies to the Middle West, Southeast, and Rocky Mountain areas, and in California plans to bring gas from Texas and other southwestern fields were quickly decided upon when it appeared that California supplies would be inadequate for future needs. The job of selling natural gas, as expressed by one veteran operator, is "largely over."

On the supply side several things need to be done. The Natural Gas Act must be amended so that the Federal Power Commission understands that its authority is restricted to those matters having to do directly with the interstate shipment of gas. Any regulation of natural-gas production and gathering should be confined to the state conservation bodies.

The matter of price is of major importance. It ties in with the protection of relative property rights, avoidance of waste, proration, and all other matters having to do with conservation. All state regulatory bodies and operators are now endeavoring to reduce flare gas to a minimum. Higher prices for gas at the well head, to be continued through to consumer rates, will largely solve this problem.

Then there is the utilization of natural gas in the manufacture of carbon black, and just around the corner is the production of motor fuels and other petroleum products from gas. Chemical utilization is increasing.

There are obvious crosscurrents in these many-headed old and new situations applying to natural gas. Serious confusion later can only be avoided through the adoption of carefully planned operating policies which assure adequate protection to everyone concerned.

Congress Passes Tanker Resolution Postponing Showdown Fight

WASHINGTON.—Congress has completed action on legislation to permit the Maritime Commission to continue operation of tankers and other vessels until June 30, 1947. The legislation was urgently requested by the President, and it was approved by both House and Senate with little debate.

Without such authority the commission would have had to lay up on February 28 some 250 tankers now in service throughout the world.

In approving this legislation congressional committees expressed the hope that no further extension will be necessary and that by June the commission can retire from the ship-operating business and turn it all over to private concerns. The commission, however, is very doubtful that it can drop all its service by that time, particularly the tanker operations, since private operators are reluctant to purchase enough vessels to meet current abnormally high demands for shipping services.

This indicates that there will be another battle in Congress over tanker operations later this spring. Many congressmen feel that there is no good reason for government operation of shipping lines and that oil companies and others should purchase sufficient surplus ships to fill all commercial demands.

On the other hand, the surplus ship-sales law makes it impossible to charter tankers and expensive to purchase them, and fleet operators hesitate to invest in ships which may be idle in a few years when the world's petroleum trade becomes normal.

West Coast Oil Workers Approving Agreement Averting Strike

WEST COAST oil workers last week were giving almost unanimous approval to a wage agreement which narrowly averted a crippling strike in the oil industry in California and other western states. The agreement was reached in an all-night conference between union and management chiefs and government conciliators.

Of the first 1,000 members of the Oil Workers International Union (C. I. O.) who voted on the agreement, 97 per cent favored approval. It was subject to the vote of approximately 22,000 union members in California, Oregon, Washington, Arizona, and Nevada.

The agreement was negotiated on behalf of Standard Oil Co. of California and General Petroleum Corp., but Richfield Oil Corp. immediately agreed to its terms. Four other major oil companies were expected to adopt the accepted agreement as a pattern and settle the union's demands from them on that basis. The four are Shell Oil Co., Inc., The Texas Co., Tide Water Associated Oil Co., and Union Oil Co. of California.

The agreement provides a general 10-cent hourly increase in base pay, plus a $17.70 cost-of-living bonus to be paid monthly through next December. The provisions were made retroactive to January 1. The agreement means an approximate increase of 20.2 cents an hour. The union had demanded a 25-cent hourly increase on a base pay of $1.40 an hour, but later scaled the figure down to 22.5 cents.

Included in the agreement was a clause providing that either management or the union may again open the question of wages after September 1 by giving a 30-day notice of such intent.

In Fort Worth, the union last week accepted an offer of The Texas Co. to raise wages 22 cents an hour in the area east of the Rockies. The move affected an estimated 10,000 employes.

Elsewhere in the country, other developments in the labor situation were in the news. Following are some of the scattered events which made up the week's labor picture.

In Houston a dispute between the union and Maritime Oil Co. threatened to tie up the north side of the Port of Houston as union officials announced a decision to post pickets in the area.

Cable tool workers in the Greater Seminole district in Oklahoma called off their 2-month-old strike with approval of O.W.I.U. officials.

Employes of Lufkin Foundry & Machine Co., Lufkin, Tex., voted 457 to 239 not to accept the A.F.L. as its bargaining agency.

Justice Department Approves Big Inch Sale

WASHINGTON.—The Department of Justice has informed War Assets Administration that it has no objections to sale of the Big Inch pipe-line system to Texas Eastern Transmission Co. WAA, on February 25, sent the company a letter of intent to close the deal, thus giving the purchaser 5 days to accept and make a second payment.

Approval of the attorney general for such sales is required by the Surplus Property Act, but WAA had expected a quick decision, since it accepted the bid February 14. It is understood that Justice Department officials closely questioned Texas Eastern organizers on many phases of their proposal, including relationships with other gas companies, financing methods, and connections with oil refineries mentioned as probable gas customers, the object being to determine if the operation would tend toward concentration of economic power.

Cancellation Upheld

AUSTIN, Tex.—The Texas land commissioner has authority to cancel an oil and gas lease on nonproducing University of Texas land, the Third Court of Civil Appeals ruled last week.

The court reversed a district court judgment. Edwin A. McKana, former operator of the lease, contended it had not been produced since 1939 only because of current marketing conditions.

Old Ocean Group Formed

HOUSTON.—Formation of the Old Ocean Royalty Owners Association has been completed with the granting of a state charter, according to R. D. MacDonald, president of the Bernard River Land Development Co. and one of the seven directors of the new association. One of the main purposes of the association is to undertake a scientific and educational study of the oil sand areas in Old Ocean field. Michael T. Halbouty, Houston petroleum engineer and geologist, has been engaged to conduct this work.

Ball Making Western Trip

Max W. Ball, director of the Oil and Gas Division, is currently making a western tour during the course of which he was scheduled to address the San Joaquin Valley Oil Producers Association, Inc., at Bakersfield, Calif., February 25, the Interstate Oil Compact Commission executive board the morning of March 8, and the North Texas Oil and Gas Association at Wichita Falls, Tex., the evening of March 8.

State, FPC Officials Seek Ways to Cope With Gas Shortage

WASHINGTON.—Representatives of utility commissions in 16 states met with officials of the Federal Power Commission here February 21 to discuss ways of meeting another shortage of natural gas in some consuming areas next year.

The shortage of steel pipe, which will interfere with completion of many gas-transmission projects authorized by FPC, was brought out at the meeting as one of the major difficulties to a larger gas supply for the 1947-48 heating season.

Among the suggestions made at the meeting for coping with the problem of below-demand gas supply were: greater allocations of pipe from steel companies, extensive use of standby equipment, and a requirement that companies fill demands of existing customers before adding new customers.

It was also proposed at the meeting, FPC said, that the use of the Big Inch system be continued beyond the term of its present lease for gas deliveries. These government-owned lines are now under temporary lease to Tennessee Gas & Transmission Co. for emergency gas deliveries. They have been awarded by WAA to Texas Eastern Gas Transmission Corp., which is planning to continue interim deliveries pending installation of equipment to convert the system for capacity gas movement.

FPC said so many gas utilities were forced to curtail service this winter that it is apparent the capacity of the nation's pipe lines are inadequate to meet demand. Estimates indicate, FPC added, that the delivery capacity of transmission lines will fall "far short" next year.

More meetings are planned with state officials and transmission company representatives, FPC said. The federal commission earlier this year sought to alleviate the current shortage by obtaining voluntary agreement as to deliveries from Panhandle Eastern Pipe Line Co.'s system and allocation of the supply made available from the Big Inch.

Last week's meeting was attended by representatives of Alabama, Georgia, Illinois, Indiana, Kansas, Louisiana, Maryland, Michigan, Missouri, Montana, New York, Ohio, Oklahoma, Pennsylvania, Texas, West Virginia, and the District of Columbia. The National Association of Railroad and Utilities Commissioners also was represented.

Haslam Resigns Public Relations Post; Program Given More Endorsements

R. T. HASLAM, vice president and director of Standard Oil Co. (N.J.) has resigned as chairman of the public-relations operating committee of the American Petroleum Institute.

Vice Chairman Franklyn, public-relations manager of Sun Oil Co., this week was serving as acting chairman at a meeting of the committee in Chicago and was expected to be appointed permanent chairman. Haslam's resignation followed contraction of pneumonia on a recent visit to Mexico.

Enthusiastic endorsements of the proposed public-relations program were in the hands of committee members on the eve of their Chicago meeting. In Fondulac, Wis., a conference of the Retail Gasoline Dealers Association of Wisconsin voted approval of the program.

In Wichita, endorsement was given the program by the Kansas Oil Men's Association and by members of the Kansas Independent Oil and Gas Producers Association who were invited to attend the Oil Men's meeting.

Throughout last week, Keaton Arnett, vice president of the Fred Eldean Organization, New York public-relations counselors who are handling the industry-wide campaign, and members of the committee were busy explaining the public-relations program to various industry groups. Arnett and C. F. Rogers have been visiting oil centers of the Southwest, including Houston, Corpus Christi, Dallas, Oklahoma City, Tulsa, and Kansas City, discussing details of the program.

Repressuring Planned In Cotton County

M. W. Blair of Wichita Falls, Tex., and other operators active in Cotton County, Oklahoma, are working on the construction of a repressuring plant for the Cache Creek pool. Plans call for the completion of the plant within 90 days. Gas will be purchased from Lone Star Gas Co. and delivered to injection wells in the Cache Creek pool which now has 226 producing oil wells. One injection well to 40 acres is contemplated.

Louisiana Gas Policy Upheld In Attorney General Opinion

BATON ROUGE.—Louisiana's policy of restricting gas exported to areas provided with other fuels for industrial use was upheld by Attorney General Fred S. LeBlanc, February 22, when he handed down an opinion that such a policy could be legally enforced by orders of the conservation commissioner.

The opinion was issued previous to the granting of new gas allowables for March and April. H. L. Hunt interests, operators of Lucky field in Bienville Parish, and principals in the controversy with the Conservation Department over shipment of Louisiana gas through the Little Big Inch pipe line, have applied for an allowable of 55,500,000 cu. ft. daily from Lucky field and 15,000,000 cu. ft. daily from the Lisbon field of Claiborne Parish.

Fee Ownership of Oil Leases Is Held Legal

OKLAHOMA CITY.—The Oklahoma Supreme Court last week ruled that oil and gas companies may own lands in fee when such property is necessary "for specifically authorized corporate purposes."

Attorneys for The Texas Co., only firm involved in the suit, argued that the properties were necessary in the company's oil development for pump stations, camps, gasoline plants, and other uses. G. B. Coryell, county attorney of Creek County, had held that such ownership was illegal.

Ashland Official Heads Special Radar Committee

M. C. Dupree, transportation manager of Ashland Oil & Refining Co., has been named chairman of a special radar committee of American Waterways Operators, Inc., which soon will begin a study of the standardization of radar equipment and navigation aids on rivers.

Dupree was appointed at a meeting in Cincinnati of U. S. Army Engineers and Coast Guard representatives, barge line operators, and radar manufacturers. C. Lester, Sohio Petroleum Co., is included in the membership of the committee.

Shell's Million-Dollar Research Center Taking Shape in Houston

THE new Exploration and Production-Research Center of Shell Oil Co., Inc., now taking shape on Bellaire Boulevard in Houston, is scheduled for completion early this summer.

All research for the company in the field of exploration and production will be consolidated in the new center. The building is being erected at a cost of more than $1,000,000 and includes a number of interesting construction techniques.

Considered fitting for the geologists who will work at the center is the fact that the facade of the building is trimmed in Texas fossil limestone. The building itself is H-shaped, with one long center wing and two shorter wings branching from it, and will provide 40,000 sq. ft. of floor space. A standard laboratory unit is repeated throughout the building. This consists of a laboratory and two adjoining offices, one of which will serve as a calculating room, the other to be assigned to staff personnel.

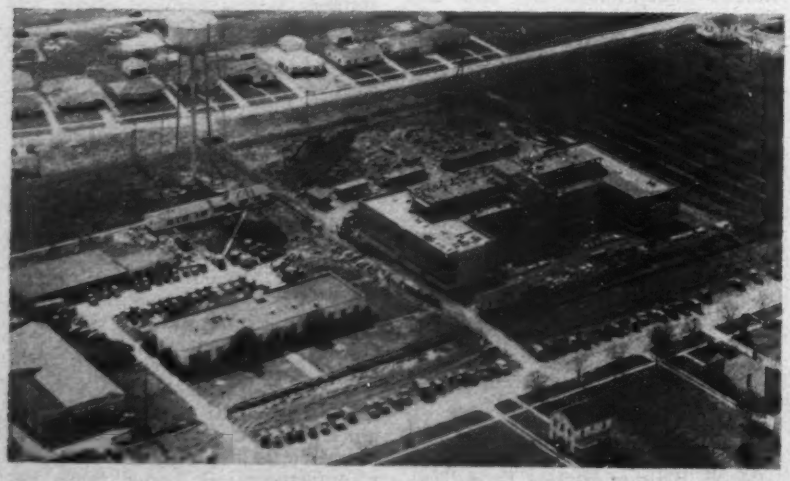
Inside walls are of pastel-hued glazed ceramic tile with aluminum channels at 30-in. intervals. Ceilings employ acoustical tile, while the flooring varies from wood block in the shops and asphalt tile in the laboratories to terrazo in the corridors. A feature of the flooring is the setting of concrete blocks, which are independent of the building, at strategic spots. On these blocks, delicate instruments and equipment can rest undisturbed by the normal vibration from passing traffic.

Besides air conditioning with individual controls for each room, the building also features controlled humidity, sterilizing lamps, and diffused fluorescent lighting. On the first floor is the reception lobby. Branching from it, and spreading into the wings, are the physics and geology laboratories and offices, the first-aid room, the cafeteria and kitchen, dark rooms for the development of seismographs, the electrical laboratory, and the machine shop, where all precision geophysical instruments for Shell and affiliates will be designed and made.

Chemistry laboratories and administrative offices occupy the second floor of the building. In conjunction with the chemical section are the glass-blowing laboratory and the photographic room. Most of the west section of the second floor will be administrative and general offices. A mahogany-paneled library will contain approximately 10,000 volumes. A drafting room, a stenographic division, a reproduction room, and lounge comprise the remainder of the west wing, with the northwest corner of the wing being reserved for the executive offices. A large conference room will accommodate 75 persons and is equipped with movie screen, projection booth, and automatic map roll.

All machinery for the center's utilities is housed on the third floor. Practically self-sufficient, the building provides its own compressed air, steam, gas, and distilled water, which is piped through the building in special pipes to avert any possible contamination.

Many new safety features are combined in the structure, including four safety showers placed at prominent spots and three push-button controls, which, in an emergency, will cut off utilities and at the same time sound an alarm. Director of Shell's exploration and production-research division is Dr. Harold Gershinowitz, with Dr. M. King Hubbert and J. P. Murphy as associate directors. The building has been contracted by the Austin Co.



Air view of construction of the new Exploration and Production-Research Center of Shell Oil Co., Inc., in Houston

Gosline Named President Of Production Pioneers

LOS ANGELES.—At an executive meeting of Petroleum Production Pioneers, held recently in Los Angeles, J. E. Gosline, southern district manager for Standard Oil Co. of California, was elected president of the organization for a second term. Elmer L. Decker, Martin-Decker Corp., was named vice president, and O. W. Morgan, Jr., Byron-Jackson Co., and L. M. Coker of the same company, were elected sergeant-at-arms, and assistant sergeant-at-arms respectively. Incumbents will retain all other offices through the current year. The organization, now numbering nearly 600, has an ambitious program, one item of which is the early revision of the constitution to permit the establishment of chapters in other oil-producing states. Much headway has been made toward one of the primary purposes of the organization—the writing of an accurate and authentic history of the petroleum industry of California. Under the direction of Ted Sutter, it is expected that details of a cooperative plan for the completion of this project will soon be available.

Looking somewhat into the future, but nevertheless a definite feature of the over-all program, is the institution of a museum which will contain early-day tools, equipment, and other mementos recalling the evolution of the industry from its inception.

Other decisions arrived at during the meeting included a plan to publish the Three-P Press, an organization news sheet, every 3 months; the appointment of a committee to consider the holding of certain open meetings in places convenient to the growing San Joaquin Valley membership; and a project to continue the effort to sign up every eligible person in California.

Deepest Well Drilling Ahead

Superior Oil Corp. 51-11 Weller, NW NW NE 11-8n-12w, Caddo County, Oklahoma, world's deepest well, is continuing to make hole and is now drilling below 16,996 ft., at last reports.

this week

EXPANSIONS—Pure announces plans to spend $9,000,000 to add facilities to Smith's Bluff (Texas) refinery. . . . ¶Dow Chemical officials say expansion of Freeport, Tex., plants over the next 5 years will involve expenditure of about $100,000,000. . . .

PIPE LINE—Texas Pipe Line, Shell Pipe Line disclose plans to construct 500-mile crude line extending from Jal, N. M., to Cushing, Okla. . . . Line will have capacity of 150,000 bbl. daily and is described as largest U. S. crude line yet constructed with private capital. . . . ¶Magnolia Pipe Line given CPA permit for $3,531,000 expansion of products system in Texas. . . . ¶War Assets Administration asks bids for purchase or lease of two terminals and 200-mile government-owned system in Florida. . . . Pipeline bids to be received until April 11. . . .

BIG INCH—WAA awaits formal report from Department of Justice as next step in sale of Big Inch system to Texas Eastern Transmission Co. . . . Officers of purchasing company meet with Justice Department officials to confer on possible monopoly aspects of proposed sale.

TANKERS—Congress passes resolution extending Maritime Commission authority to operate U. S. tankers until June 30. . . . Showdown fight on continued operation of U. S. tankers seen when another extension is sought. . . .

NATURAL GAS—FPC officials and representatives to utility commissions of 16 states meet in Washington to discuss means of coping with indicated continued shortage of natural gas next winter. . . . Suggestions advanced include greater allocations of steel for gas-line construction. . . . ¶Oklahoma representative introduces legislation in Congress restricting power of FPC. . . . Measure would forbid FPC jurisdiction over end use, producing, gathering activities and force changes in commission's rate-figuring methods. . . .

INTERNATIONAL—Iraq Petroleum receives legal opinion holding that "Red Line Agreement" is in effect. . . . Jersey Standard and Socony-Vacuum expected to stand by previous interpretation that agreement was voided and that their projected purchase of an interest in Arabian American is legal. . . . ¶Iraq Petroleum's Kirkuk-Haifa pipe line severed by terrorists in Palestine, but extent of damage, while believed slight, is not known. . . . ¶Six U. S. companies reported designated to participate in the construction of Trans-Arabian Pipe Line Co.'s new crude line from the Persian Gulf area to the Mediterranean. . . .

EXPLORATION—Humble has prospective pool opener in Sardune area of Liberty County, Texas. . . . ¶Alta Mesa field, Brooks County, and North Minnie Bock field, Nueces County, Texas, get new oil pay discoveries. . . . ¶Coleman County, Texas, has new discovery in Strawn formation at 2,900 ft., flowing 75 bbl. 43°-gravity oil. . . . ¶Superior opens new Tensleep pool on Herrick Dome, Albany County, Wyoming. . . . ¶New depth record set in North Louisiana at 14,976 ft. by Cotton Valley Operators Committee in Webster Parish. . . . ¶World's deepest well, Superior test in Caddo County, Oklahoma, approaches 17,000-ft. mark, now drilling at 16,996 ft. . . .

Standard Oil Co. of California's $4,370,000 program for modernization of loading facilities at its Richmond refinery is now well along toward completion as shown by this panoramic view. The mile-long reinforced concrete causeway, shown curving off to the left, is completed and soon will carry vehicular traffic to the end of the loading wharf. This will permit abandonment of the existing narrow-gage electric railway. The loading section of the wharf, constructed at right angles to the causeway, is being lengthened from its present 1,516 ft. to 2,466 ft. There will be four deep-water berths for bulk loading on the outer face and one on the inner face, as well as space for six barges

Six NPC Committee Members Named

WASHINGTON. — All committees authorized by the National Petroleum Council at its January 21 meeting have now been appointed by Chairman Walter S. Hallanan with the assistance of the appointments committee.

The final six committees announced by the NPC chairman include five dealing with various types of petroleum transportation and one temporary group which will advise the Oil and Gas Division of the Department of the Interior on international standards for measuring aviation fuel. The transportation committees consist of barge, pipe line, tanker, truck, and rail groups. They will make factual studies of transportation facilities available and necessary in the event of a national emergency.

Personnel of two other committees, economics advisory and a temporary group to study aircraft-fuel-productive capacity were announced earlier by Hallanan (The Oil and Gas Journal, February 22, page 205).

Petroleum Barge Transportation

The following were appointed to the committee on petroleum barge transportation: Harry H. Gilbert, Oil Transfer Corp., New York, chairman; Munger Ball, Sabine Transport Co., Port Arthur, Tex.; H. M. Baskerville, Western Oil & Fuel Co., Minneapolis; A. H. Calhoun, American Barge Line Co., Pittsburgh; A. W. Frey, National Oil Transportation Co., New York; J. W. Hershey, Butcher-Arthur Co., Houston; R. G. Kimball, Standard Oil Co. (N. J.), New York; H. L. Lyendecker, City National Bank, Houston; Ed Morrill, Sohio Pipe Line Co., St. Louis; Glen Taylor, Mississippi Valley Barge Line Co., St. Louis; Parker Wise, Socony-Vacuum Oil Co., Inc., New York; and M. C. Dupree, Ashland Oil & Refining Co., Ashland, Ky.

Pipe-Line Transportation

The following were appointed to the committee on petroleum pipe-line transportation: B. I. Graves, Tide Water Associated Oil Co., New York, chairman; Bruce Clardy, Stanolind Pipe Line Corp., Tulsa; W. R. Finney, Standard Oil Co. (N. J.), New York; R. W. Hendee, Colorado-Interstate Natural Gas Co., Colorado Springs; George A. Hill, Jr., Houston Pipe Line Co., Houston; A. N. Horne, Texas-Empire Pipe Line Co., Tulsa; D. D. Irwin, Pure Transportation Co., Chicago; W. Alton Jones, Cities Service Oil Co., New York; Sidney Johnson, Standard Oil Co. of California, San Francisco; W. C. Kinsolving, Sun Oil Co., Philadelphia; C. H. Kountz, Sinclair Oil Co., New York; J. H. Pipkin, The Texas Co., New York; J. French Robinson, East Ohio Gas Co., Cleveland; O. D. Robinson, Republic Pipeline Transportation Co., Pittsburgh; T. E. Swigart, Shell Pipeline Corp., Houston; and L. H. True, Magnolia Pipe Line Co., Dallas.

Rail Transportation

Members of the rail-transportation committee include: Fayette B. Dow, general counsel, National Petroleum Association, Washington, chairman; A. D. Carleton, Standard Oil Co. of California, San Francisco; B. C. Graves, Union Tank Car Co., Chicago; C. R. Musgrove, Phillips Petroleum Co., Bartlesville; Ralph Russell, Pennsylvania Railroad; Porter L. Howard, Sun Oil Co., Philadelphia; R. J. Walshe, The Texas Co., New York; E. E. Brumberg, Quaker State Oil Refining Corp., Oil City, Pa.; Percy Anderson, Lion Oil Co., El Dorado, Ark.; and J. E. Lewallen, Anderson-Prichard Oil Co., Oklahoma City; A. G. Anderson, Socony-Vacuum Oil Co., Inc., New York; Walter J. Curley, General American Transportation Co., Pittsburgh; Gilbert J. Mueller, Argo Oil Corp., Denver; C. L. Henderson, Vickers Petroleum Co., Wichita; and H. R. Gillespie, Deep Rock Oil Corp., Chicago.

International Standards

Headed by W. W. White, Intava, Inc., New York, as chairman, members of the international-standards committee include: E. G. Mackenzie, The Texas Co., New York; T. B. Rendell, Shell Oil Co., Inc., New York; E. W. Dean, Standard Oil Co. (N. J.), New York; E. J. S. Pigott, Gulf Oil Corp., Pittsburgh; J. Bennett Hill, Sun Oil Co., Marcus Hook, Pennsylvania; L. C. Beard, Socony-Vacuum Oil Co., Inc., New York; Joseph H. McCable, E. W. Saybolt & Co., New York; Randolph Schleuter, Charles Martin & Co., New York; George B. Hargens, Standard Oil Co. of California, San Francisco; C. H. Baxley, Intava, Inc., New York; J. B. Fisher, Kendall Refining Co., Bradford, Pa.; C. A. Johnson, Socal Oil & Refining Co., Los Angeles, and John M. Lovejoy, Seaboard Oil Co.

Tanker Transportation

Those named to the committee on petroleum tanker transportation are: J. P. Patterson, Pan American Petroleum & Transport Co., New York, chairman; Willard Bergen, Marine Transport Lines, Inc., New York; T. E. Buchanan, The Texas Co., New York; Millard Gamble, Standard Oil Co. (N.J.), New York; C. R. Innis, Sun Oil Co., Philadelphia; W. F. Jones, Gulf Oil Corp., Pittsburgh; Charles Kurz, Keystone Shipping Co., Philadelphia; D. K. Ludwig, National Bulk Carriers, New York; F. R. Pratt, Socony-Vacuum Oil Co., Inc., New York; and C. B. Watson, Pure Oil Co., Chicago.

Truck Transportation

Those named to the committee on petroleum truck transportation are: Lee R. Cowles, Standard Oil Co. (Ind.), Chicago, chairman; C. C. Benedict, Socony-Vacuum Oil Co., Inc., New York; L. S. Bessonett, Standard Oil Co. of California, L. A. Carlson, Gulf Oil Corp., Pittsburgh; E. L. Clifford, Tide Water Associated Oil Co., New York; Charles J. Foster, Deep Rock Oil Corp., Chicago; A. B. Gorman, Standard Oil Co. (N. J.), New York; E. W. Jarvis, Standard Oil Co. (Ky.), Louisville; S. F. Niness, Leaman Transportation Co., Downington, Pa.; Clark Seargeant, Seargeant Transportation Co., Santa Barbara, Calif.; C. Austin Sutherland, National Tank Truck Carriers, Inc., Washington; and Charles J. Yokem, Refiners Transport & Terminal Co., Detroit.

Legislation to Curb FPC Introduced in House

WASHINGTON.—A bill to revise the Natural Gas Act by curtailing the authority of the Federal Power Commission in many important respects has been introduced in the House by Rep. Ross Rizley of Oklahoma.

The measure was drafted with the assistance of attorneys of several natural-gas companies and embodies suggestions made by the industry during the natural gas investigation conducted by FPC.

The bill would specifically prevent FPC from controlling the end use to which natural gas is put after interstate transmission, deprive it of jurisdiction over direct industrial-sales, production, and gathering activities or local distribution, require the use of the field price of gas in determining operating costs for rate-making purposes, compel FPC to allocate costs between properties under its jurisdiction and nonjurisdictional properties in fixing rate bases, and require FPC to expedite action on applications for new construction.

Secondary Recovery Subject of Session

WICHITIA FALLS, Tex.—An all-day session on secondary recovery again will be conducted by members of the North Texas Oil and Gas Association here March 8.

Speakers in the meeting will include: W. J. Murray, Jr., member of the Texas Railroad Commission; Paul D. Torrey, Houston consulting petroleum engineer; H. M. McClain, Magnolia Petroleum Co.; Don Martin, Hercules Powder Co.; and D. B. Taliaferro, Bureau of Mines. An open forum on secondary recovery will be conducted during the afternoon session.

The seventeenth annual banquet of the association will be held the evening of March 8 and will include as speakers Max W. Ball, new director of the Oil and Gas Division of the Department of the Interior, and E. DeGolyer, Dallas, petroleum engineer and geologist.

Kansas Oil Men Ask Equal Taxes for Cooperatives

WICHITA, Kans. — Support of a proposal to provide equal taxation on private and cooperative enterprises was pledged here last week at the thirty-second annual convention of the Kansas Oil Men's Association.

The association also voted approval of the proposed 1-cent increase in the state tax on gasoline and recommended that it remain in effect until the state can match federal funds available for construction of farm-to-market roads.

Dow Chemical Co. Plans $100,000,000 Program

FREEPORT, Tex.—Dow Chemical Co. officials last week announced plans to spend $100,000,000 within the next 5 years for construction of new facilities in its Freeport plants.

Dr. A. P. Beutel, general manager, said work now scheduled or already under way totals about $25,000,000. Dr. Willard H. Dow, who announced the program, said products are so basic that "there is no limit that anybody knows of to the chemical industry."

Offshore Drilling, Fischer-Tropsch Among A.S.M.E. Topics

TECHNICAL papers on the Fischer-Tropsch process, engineering details of offshore drilling, and the regeneration of spent catalysts will highlight the petroleum sessions of the annual spring meeting of the American Society of Mechanical Engineers.

Opening session of the 3-day regional meeting will get under way at 9 a.m. Monday, March 3, in the Mayo Hotel, Tulsa, headquarters of the meeting, following a trip to the Will Rogers Memorial, Claremore, for early arrivals Sunday.

Two technical sessions devoted to petroleum will be conducted Wednesday, one in the morning and the second after a scheduled luncheon devoted to problems of management. The paper on regeneration of catalysts will be read in a session devoted to fuels, scheduled for 9 a.m. Tuesday.

Thirteen technical sessions, in addition to general luncheon and banquet sessions, will fill the program of the 3-day meeting, which will close Wednesday afternoon. The program follows:

Monday, March 3

Power (I), 9 a.m.—"A Method for Testing and Studying the Cost of Operation of Centrifugal Boiler-Feed Pumps," A. C. Pasini, technical engineer, E. M. Spencer, and J. R. Hamman, junior engineer, Detroit Edison Co., Detroit, Mich.; and "Fatigue Tests of Welding Elbows and Comparable Double-Mitre Bends," A. R. C. Markl, chemical research engineer, Tube Turns, Inc., Louisville, Ky.

Keynote luncheon, noon.—Address, "Opportunity Lies About You," Eugene W. O'Brien, president, A.S.M.E.

Aviation, 2:30 p.m.—"Propeller-Drive Gas Turbines," Alan Howard, turbine-engineering department, and C. J. Walker, development engineer, General Electric Co., Schenectady, N. Y.; and "Gas-Turbine Combustion," E. P. Walsh, design engineer in charge of combustion development, aviation-gas-turbine division, and W. D. Pouchot, Westinghouse Electric Corp., Philadelphia, Pa.

Power (II), 2:30 p.m.—"Operating Experience With Heat Pumps," Philip Sporn, executive vice president, American Gas & Electric Service Corp., New York, and "Steam-Jet Refrigeration for Turbo-Generator Air, Gas, and Oil Coolers," P. H. Knowlton, assistant design engineer, turbine-generator division, General Electric Co., Schenectady, N. Y.

Power (III), 8 p.m.—"Outdoor Power Plants," A. R. Smith, managing engineer, turbine-generator division, General Electric Co., Schenectady, N. Y.; "Refiner's Viewpoint of Electric Power Use," W. H. Stueve, commercial and industrial agent, Oklahoma Gas & Electric Co., Oklahoma City.

Oil and Gas Power, 8 p.m.—"Oil-Filter Testing," W. J. Ewbank, chemical research engineer, Briggs Filtration Co., Bethesda, Md.; and "Turbines for Natural-Gas Expansion," Stephen Bencze, steam-turbine development engineer, Elliott Co., Jeannette, Pa.

Management (I).—"Motion and Time Study Application to Petroleum Production," H. G. Thuesen, head of the department of industrial engineering, Oklahoma A. & M. College, Stillwater.

Tuesday, March 4

Fuels, 9 a.m.—"Combustion of Coke Deposit on a Synthetic-Bead Cracking Catalyst," W. A. Hagerbaumer, mechanical engineer, Socony-Vacuum Oil Co., Inc., New York, and Russell Lee, Socony-Vacuum Oil Co., Paulsboro, N. J.; "The Fuel Industry of Japan," W. T. Reid, Battelle Memorial Institute, Columbus, Ohio; and "Regeneration of Spent Catalyst in Fluid Catalytic Cracking," J. F. Snuggs, Standard Oil Co. (Ind.), Whiting, Ind.

Education, 9 a.m.—Subject: "Unified Curriculum." Speakers: Charles W. Crawford, head of the mechanical-engineering department, Texas A. & M. College, College Station; Eugene F. Dawson, director of the school of mechanical engineering, University of Oklahoma, Norman; and Douglas Ragland, Humble Oil & Refining Co., Houston.

Industrial Instruments and Regulators, 9 a.m.—"Deep-Well Camera," O. E. Barstow, Dow Chemical Co., Midland, Mich., and C. M. Bryant, Dowell Incorporated, Tulsa; and "Apparatus for Analysis of Reservoir Fluids," Paul G. Exline, section engineer, and H. J. En Dean, engineer, Gulf Research & Development Co., Pittsburgh.

General Luncheon, noon.—"Future Industries of the Southwest," John J. Grebe, Oak Ridge, Tenn.

Plant Trips, 2 p.m.—Franks Manufacturing Corp., Spartan School of Aeronautics and Airplane Overhaul and Repair Station, and Macnick Manufacturing Co.

Banquet, 6:30 p.m.—Address: "Engineering in the Future Southwest," Harold Vagtborg, president, Midwest Research Institute, Kansas City, Mo.

Wednesday, March 5

Management (II), 9 a.m.—"Selection, Training, and Management of Sales Force," A. F. Lyster, manager, industrial department, Socony-Vacuum Oil Co., Inc., Kansas City, Mo.

Petroleum (I), 9 a.m.—"The Fischer-Tropsch Process," George Roberts, laboratory chief, Stanolind Oil & Gas Co., Tulsa; and "Engineering Details of Off-Shore Drilling Operations," R. G. Watts, Magnolia Petroleum Co., Dallas, Tex.

Management Luncheon, noon.—"Management's Participation in Enacting Legislation to Protect Industry's Interests," speaker to be announced.

Metals Engineering, 2:30 p.m.—"Low-Temperature Impact Properties of Some Cast Steels," H. D. Churchill, Case School of Applied Science, Cleveland, Ohio; "Conventional Straightening of Welded and Seamless Tube Stock as Practiced in the Industry," E. W. Wrage, chief engineer, Globe Steel Tubes Co., Milwaukee; and "Fabrication Notes on Corrosion-Resistant Alloys," J. C. Holmberg, metallurgist, Tulsa Boiler & Machinery Co., Tulsa.

Petroleum (II), 2:30 p.m.—Paper: "Hydraulic Pumping Units," R. M. Stuntz, mechanical engineer, Gulf Oil Corp., Tulsa.

Hearing Scheduled on Multiple Completions

AUSTIN.—The controversial question of multiple-zone completions will be argued before the Texas Railroad Commission in a hearing scheduled to begin here March 5.

In a notice announcing the hearing, the commission said it "is desirous of hearing evidence" regarding "the feasibility and practicability of the use of dual and triple completions in the same well bore" for oil and gas production.

The commission said it is particularly interested in learning "what the experience of the industry has been through the employment of such completions . . . whether the employment of such means of obtaining production . . . causes preventable physical waste, whether or not such completions are in keeping with the dictates of sound engineering principles and production practices, and whether or not and under what conditions, if any, such producing practice should be permitted."

The notice said the hearing is being conducted so that the commission "might give thorough consideration to the matter of multiple-zone completions as a producing practice in the state with the view of determining whether such completions are conducive to the greatest ultimate recovery of hydrocarbon materials from subterranean reservoirs . . ."

In another notice the commission set for April 1 a hearing to consider the application of Taylor Refining Co. to conduct repressuring operations in Agua Prieta field of Duval County. The commission recently authorized Stanolind Oil & Gas Co. to undertake a gas repressuring project on its H. H. Merten lease in Panhandle field, Gray County.

Pure Plans $9,000,000 Texas Refinery Expansion

A $9,000,000 expansion program for its Smith's Bluff refinery near Nederland, Jefferson County, Texas, has been announced by Pure Oil Co.

Pure officials said the new facilities are designed largely to replace those destroyed by fire at Marcus Hook on the Atlantic seaboard. Permits already have been issued by Civilian Production Administration for construction of buildings for the manufacture of high-pressure lubricants, sulfurized cutting oils, and soap greases.

The Nederland refinery now has a crude capacity of 55,000 bbl. daily and a cracking capacity of 98,000 bbl. daily.

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WORLD-WIDE OIL DEVELOPMENTS

Legal Opinion Indicates "Red Line Agreement" Still in Force

by Warren W. Burns

NEW YORK.—The legality of Iraq Petroleum Co., Ltd.'s, legendary "Red Line Agreement" now seems beyond doubt. It is in force.

The agreement figures prominently in the proposed purchase of a share of Arabian American Oil Co. by Standard Oil Co. (N. J.) and Socony-Vacuum Oil Co., Inc. That it is still valid is the studied opinion given Iraq Petroleum by an excellent British legal source who maintains that, while the agreement was nullified for a time, due to the enemy alien status of one of the partners, Cie. Francaise des Petroles, ironically it was reinstated by all the other partners when Cie. Francaise was welcomed back into I.P.C. and when the partners agreed to aid in the postwar financing of joint exploratory and development projects.

Currently, negotiations are going on in London with the hope that either the "Red Line Agreement" might be rewritten or that some other compromise might be worked out whereby Cie. Francaise, 35 per cent owned by the French Government, will withdraw its legal protest filed in a British court. Among compromises which have been mentioned are a guarantee on the part of the two American partners to agree to expansion of the Kirkuk-Mediterranean pipe line facilities, and a deal whereby Near East Development Corp. would relinquish part of its 23.75 per cent ownership to Cie. Francaise.

Cause of French Concern

The French are perturbed because of the fact that they do not have adequate crude oil. Oddly enough, this fear seems to have been abetted by an outside source last week when a report from Jerusalem said terrorists had severed the Iraq pipe line. Iraq Petroleum's partners also include D'Arcy Exploration Co., a subsidiary of Anglo-Iranian Oil Co., Ltd., and Anglo-Saxon Petroleum Co., a unit of Royal Dutch-Shell. The remaining 5 per cent is owned by C. S. Gulbenkian who reportedly offered his share to the International Petroleum Cooperative Alliance for $75,000,000, but as the co-ops had only $1,000,000 cash, Gulbenkian is said to have indicated that it was far from enough as a down payment. Gulbenkian cannot legally offer his percentage to anyone until he has given the other I.P.C. partners a chance to buy.

Jersey Standard and Socony-Vacuum previously received British legal advice that the agreement was dead; Cie. Francaise also received British legal advice that it was not. Both Jersey Standard and Socony-Vacuum, as individual companies, maintain they will stand by their British counsel's advice regarding what is termed the abrogation of the "Red Line Agreement," despite the legal opinion given Iraq Petroleum.

Since announcement of the world's largest oil deal, which is still pending (The Oil and Gas Journal, December 21, 1946, p. 42), the question has been asked as why only Cie. Francaise protested. Actually Gulbenkian would have protested if Cie. Francaise had not. In fact at one time it was thought that the protest would be filed jointly. The British, it is presumed, said nothing as Jersey Standard and Socony-Vacuum also have a pending deal whereby they will purchase upwards of 100,000 bbl. of crude daily from Anglo-Iranian and also furnish the U. S. dollars for construction of a pipe line—aside from construction of the trans-Arabian line. Moreover, Anglo-Iranian wanted some sort of a deal with U. S. oil companies in Iran, largely due to the political activities of Russia in northern Iran.

This leaves only the Shell partner. Shell has been lifting the larger portion of the Gulf Exploration Co.'s share of crude from Kuwait and has been awaiting the consummation of the Arabian American and Anglo-Iranian negotiations to announce an arrangement to continue purchasing most of Gulf's share of the Kuwait crude. Presumably, Shell was not greatly disturbed over any of the arrangements even though Kuwait lies outside of the red line area and any such purchase arrangement would not be in violation of the agreement—whether it was in effect or not.

Six U. S. Companies to Lay Trans-Arabian Pipe Line

Six U. S. companies are reported to have been designated to lay the 1,050 to 1,100-mile crude-oil pipe line for Trans-Arabian Pipe Line Co. from the Persian Gulf area to the Mediterranean.

Williams Brothers interests, Tulsa, is expected to construct the western end of the line to its yet-undisclosed terminus on the Mediterranean. The Williams Brothers company will bury a part of its section, though much of the remainder of the line will be laid aboveground across the Arabian Desert.

The five other companies which are to lay the eastern section are: the Bechtel companies of San Francisco; Sverdrup & Parcel of St. Louis; the Knudsen companies of Boise, Idaho; the H. C. Price companies of Bartlesville, Okla., and Robert Conyet of California.

Arrangements reportedly have been made with Consolidated Steel Corp., Los Angeles, to fabricate and deliver the pipe for the Trans-Arabian project. Steel plates for the pipe will be produced in U. S. Steel Corp.'s plant at Geneva, Utah. Consolidated stockholders are to vote March 3 on U. S. Steel's offer to acquire Consolidated's fixed assets and business, and if the sale is approved, the Trans-Arabian pipe production will be an all-U. S. Steel job.

Initial deliveries of 30 and 31-in. pipe for the line are expected to commence by October 1.

N.K.P.M. Officials Await Reentry To Sumatra Producing Areas

THE date when refining operations in Sumatra will resume hinges upon how soon it will be possible to reenter and inspect the producing fields, according to Edward N. Leibacher, general manager of Nederlandsche Koloniale Petroleum Maatschappij, East Indies affiliate of Standard-Vacuum Oil Co., who arrived recently at The Hague en route to Batavia after a 2 months' trip to the United States.

Leibacher expressed the hope that production technicians of N.K.P.M. will soon be able to visit the company's south Sumatra oil fields. This, he pointed out, is a first step towards rehabilitation of the fields, which before the war supplied crude to N.K.P.M.'s 45,000-bbl. daily Soengei Gerong refinery near Palembang. So far, company representatives have not been able to inspect the fields to determine their condition after having been in Japanese hands during the war.

A good start has already been made towards getting the refinery back into shape. The plant suffered major damage when it was blown up in February 1942 by the Netherlands military authorities. At the present time N.K.P.M. has about 2,000 Indonesians working in the plant and expects to increase this number substantially when additional food supplies become available. The workers have to be paid in commodities rather than money because of currency difficulties.

Complete rehabilitation of the refinery must await the arrival of special equipment from the United States, currently delayed by handling and shipping difficulties. It may also be necessary to make major repairs and replacements to the pipe line from the fields to the refinery, a distance of some 85 miles.

Good Progress Made

Substantial progress has been made in reconstructing N.K.P.M.'s deepwater terminal at Tandjong Oeban in the Riouw Archipelago near Singapore, Leibacher said. This installation was almost completely destroyed during the war and is now being restored. Its ultimate storage capacity will be approximately 1,200,000 bbl. The terminal has adequate draft for ocean-going tankers and thus supplements loading operations at the Soengei Gerong refinery which deepwater tankers cannot reach when loaded because of a sand bar at the mouth of the Moesi River.

Leibacher plans to stay only briefly in The Hague before proceeding to the Indies. He was accompanied to Europe by two Standard-Vacuum executives, H. W. McCobb, in charge of production, and Raymond Leibensperger, head of geological and geophysical work.

N.K.P.M.'s refining activities at Soengei Gerong date back to 1923 when the company began preparations to construct a small plant. The site was swamp land and jungle area, and since the work began, nearly 1,000,000 lineal feet of piling have been driven to support the refinery equipment.

At the time of the refinery's destruction in February 1942, it was capable of operating at a capacity of from 47,000 to 50,000 bbl. of crude daily. The fields west of the refinery at Talang Akar-Pendopo were developed as a result of the company's drilling operations which began in the N.E.I. in 1912. The lines to the refinery consisted of two 8 in. and one 6 in.

Initial crude capacity of the Palembang refinery in 1926 was 3,500 bbl. daily. Three years later, this was raised to 7,000 bbl. daily, and in 1931, to 25,000 bbl. daily. Further improvements approximately doubling capacity were made in 1936. An aviation-gasoline plant was constructed in 1939 and placed in operation in April 1940.

Before its destruction, the refinery turned out a complete line of products. N.K.P.M. produced and refined about one-third of all N.E.I. oil prior to the war. The wax plant at Palembang was one of the world's largest with an annual capacity of 36,000 tons.

Although much of the equipment was destroyed prior to the arrival of the Japanese, some of it had been rebuilt by early 1943, and the Japanese were refining 20,000 daily at Palembang and running from 30,000 to 35,000 bbl. daily through repaired pipe lines from partially reconditioned wells.

Thornburg Scheduled to Leave for Turkey

NEW YORK.—Max Thornburg, consultant on foreign oil and a former vice president of Standard Oil Co. of California, is scheduled to leave March 7 for Turkey to study the possibility of foreign capital participating in exploration and development of the country's petroleum and other natural resources.

Thornburg is expected to spend 3 months in Turkey writing the report for the Twentieth Century Fund of which he is research director.

The Turkish Government is currently conducting a wide-scale exploratory program through the Turkish Mining Research and Exploration Institute. Last year, George E. Failing Supply Co. shipped 11 drilling rigs to Turkey. The country has no commercial production at the present time.

Colombia's 1946 Output Down Due to Strike

BECAUSE of the oil workers' strike last November in Colombia, crude production for 1946 showed a 1.76 per cent drop compared with 1945. Colombia's daily average output for 1946 was 61,434 bbl. compared with 62,600 bbl. in 1945. November 1946 production dropped 64,625 bbl. daily to 23,699 bbl. Colombia's highest production was in 1940 when the daily average was 70,040 bbl.

The following table gives 1945-46 comparison figures in Colombia's three commercially producing concessions.

Concession	Bbl. daily 1946	Bbl. daily 1945	Gravity (A.P.I.)
De Mares	35,699	42,875	24.5°
Barco	16,944	15,179	33 & 46°
Yondo*	8,791	7,863	21.5°
Total	61,434	62,600	....

*Including Casabe field which started production June 6, 1945.

The 1946 exports from the three concessions were: De Mares, 8,970,487 bbl.; Barco, 6,153,533 bbl.; and Yondo, 2,897,427 bbl. The weighted average price per barrel, f.o.b., was $1.20 for De Mares; $1.57 for Barco, and $1.12 for Yondo.

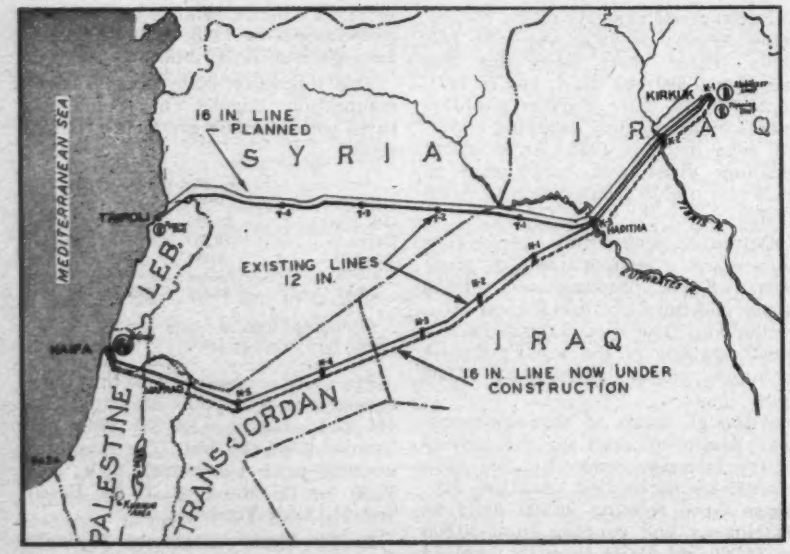
In De Mares concession 59 wells were completed in 1946, 49 being producers, and 5 others waiting pump. Two were abandoned and three are awaiting recompletion. In the Barco, four rigs are running and nine other locations are being prepared.

Colombian Gulf Oil Co. abandoned its first test at 8,250 ft. in Sardinata early in January and is preparing to spud its second test, about 7 kilometers (4⅜ miles) to the south. Gulf's first wildcat in Zahino was being cored at 5,992 ft. early in February.

General view of the Kirkuk stabilization plant

Completion of New Kirkuk-Haifa Line Expected in Spring of 1949

by Dr. Earnest Aschner



Route of the Kirkuk-Mediterranean pipe lines showing pipe-line stations and other oil installations

HELD up through the war, the development of Palestine as an oil-handling and producing center is now entering a new phase with a number of prewar projects being taken from the planning stage to the construction stage, while a number of entirely new programs are under consideration by British and American oil interests.

As these plans take shape, the political future of this strife-torn country, which is of vital concern not only to the Jews and Arabs but also to Britain and America, is still the subject of grave deliberations in the capitals of the Near East and of the western democracies. The serious unrest and frequent outbreaks of violence in the country over a period of more than a year have not interfered with the operations of the oil companies,

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and there is no doubt that whatever solution eventually will be found for the political future of the country, the interests of the British, American, French and Dutch oil companies will be safeguarded.

Pipe-Line Construction

Construction of the new Kirkuk-Haifa pipe line of Iraq Petroleum Co., Ltd., is well under way, though the operations have been slowed owing to delays in the delivery of transport, pipes, equipment, and other materials, so that completion of the line is not expected before the spring of 1949—a full year later than originally planned. Following completion of this line, construction of the Kirkuk-Tripoli stretch will begin and it is expected that this will take another 12 months.

The present 12-in. system consists of a double line from Kirkuk to Haditah, about 150 miles long. From Haditha, one line leads northwest to Tripoli, 380 miles distant, and a second line southwest to Haifa, 470 miles distant. The new lines will consist of 16-in. pipe paralleling this existing system. Completion of both the new Kirkuk-Haifa and the new Kirkuk-Tripoli lines will give four

Interior of a pump station on the present Kirkuk-Mediterranean system

lines, two 16-in. and two 12-in., in the stretch between Kirkuk and Haditha.

A total of 12 pump stations strung across the desert keep the oil moving at the rate of 2,000,000 tons (15,000,000 bbl.) yearly through each of the present 12-in. lines.

The laying of the new lines will require the enlargement of the existing pump stations. In view of the scarcity of water, diesel pumping units will again be used. Cooled water for these engines is obtained by circulating through heat exchangers countercurrent to the flow of oil, thus minimizing requirements for make-up water. The first three pump stations (K1, K2, and K3) are situated along the 150-mile stretch between Kirkuk and the Euphrates, while another four units (T1-T4) are pumping the crude through the north line to Tripoli and five pump stations (H1-H5) bring the oil across the south line to Haifa.

Work on the new line began at the end of 1945, and up to the present some 150 miles of pipe have been strung of which about 50 miles have been welded between H3 and H4 stations, heading in the direction of the Euphrates. A total of 180,000 tons of pipe is required in the construction of both lines, and deliveries are steadily arriving from England, while France is making small shipments which are to be increased as production gets under way. The pipe is transported from the Port of Haifa on the Hejaz railway to Mafraq in Trans-Jordan, a small station on the edge of the desert, where the pipe line and Haifa-Baghdad road cross the railway. East of Mafrak transport is by road vehicles running either along the Haifa-Baghdad road or across the open desert.

All materials required at the eastern end of the line are shipped to Basrah on the Persian Gulf and thence over the Iraq State railways to Baiji, where the pipe line crosses the Tigris River.

The two small rail stations, Mafrak and Baiji, are thus the western and eastern rail heads for construction; locations over the intervening 500 miles are supplied by road haulage from the appropriate rail head. Temporary camps for stores, workshops, and personnel have been erected at Mafrak, and other works include main-line camps, station-construction camps, and the repair and maintenance of existing roads, bridges, and ferries.

The contract for ditching has been awarded to John Howard & Co., and the work is making good progress. Specialized equipment, such as wrapping machines have been ordered in the United States, while the transport and other standard equipment is coming from Britain. The line is being manual-welded. It is expected that during the peak of construction some 4,000 local workers will be employed.

Construction of additional pipe lines from Kirkuk in Iraq to the Mediterranean Coast by Iraq Petroleum Co., Ltd., is discussed in this article. The author, Dr. Ernest Aschner, joined the staff of the Palestine Post, only English-language daily in Palestine, in 1935, and since 1937 has been in charge of the newspaper's Haifa bureau. A contributor to various European and American periodicals, he is Haifa and north Palestine correspondent for Reuters news service and the London Daily Express and the Sunday Express. He was educated at Berlin University and has traveled extensively in Europe and the Middle East. In two succeeding articles, Dr. Aschner will discuss improvements now in progress at the Haifa refinery of Consolidated Refineries, Ltd., and the Palestine exploration program of Iraq Petroleum Co., Ltd.

Terminal Enlargement

With the completion of the new line, additions to existing terminal facilities will be required, both in tankage and submarine sea-loading lines. The present terminal site in Haifa Bay comprises 24 tanks with a total storage capacity of 264,000 tons (2,000,000 bbl.), while there are 27 tanks with a capacity of 305,000 tons (2,300,000 bbl.) at Tripoli. Loading facilities at Haifa at present include four submarine lines in Haifa Bay and two tanker berths in the oil dock of Haifa Port. The extent of the additional tankage and loading lines which will be required at the terminal sites cannot yet be estimated as this will depend on the amount of crude to be exported and the quantities absorbed by the local refineries.

At the other end of the line, work is proceeding on the enlargement of the stabilizer plant in Kirkuk, while additional wells are being drilled in Kirkuk field to provide the increased quantities of crude required for the new lines. The Kirkuk field is believed to be one of the world's richest, and the 45,000,000 tons (330,000,000 bbl.) withdrawn from it since the present 12-in. lines to Haifa and Tripoli commenced operations in 1934, are only a small fraction of the proved reserves there.

International

Terrorists Damage Line

The exact damage inflicted by Palestine terrorists upon Iraq Petroleum Co., Ltd.'s 620-mile 12-in. pipe line from Kirkuk field, is not yet known in this country. Irgun Zvai Leumi, the underground organization, reportedly has admitted that it is responsible for dynamiting the line.

The damage was reportedly done near the Haifa terminus. This line has been delivering approximately 85,000 bbl. daily of crude to the Mediterranean terminals.

Union Well Drilling Ahead

Union Oil Co.'s exploratory well at Santa Rosa in the Paraguayan Chaco is drilling below 7,600 ft. with no showing yet of oil-bearing sands, according to information received by the Office of International Trade of the Department of Commerce.

WASHINGTON WATCHING

BY HENRY D. RALPH

War-Emergency Oil Laws

WASHINGTON.—Two wartime petroleum statutes were mentioned by President Truman in his message to Congress last week recommending specific action on about 100 emergency laws.

He asked outright repeal of the O'Mahoney Oil Royalties Act of December 24, 1942, which provides a flat 12½ per cent royalty for a discoverer of new oil or gas deposits on the public domain. This law is scheduled to expire at the end of the national emergency proclaimed by the President on May 27, 1941, but in the meantime Congress has enacted permanent revisions of the oil and gas leasing act incorporating this provision.

The President also recommends that there be no extension of the Cole Pipe Line Act which permits the President to certify that a projected oil pipe line is necessary for national defense and therefore entitled to power of eminent domain to condemn rights-of-way. This was first enacted in 1941 because railroad interests threatened to block construction of several pipe lines in the southeastern states, and was later extended to remain in effect for 1 year after the end of the national emergency. Rights-of-way for lines built under government auspices during the war were acquired under this act, and the President stated that the War Assets Administration may need to make use of it in disposing of its surplus pipe lines. He recommended that it be allowed to remain in effect until its stated expiration date, which is uncertain because the President has not yet proclaimed an end to the emergency.

End of the Subsidy

THE stripper-well premium price plan, or subsidy, expires by statute April 1, and the Office of War Mobilization and Reconversion is planning to liquidate the program promptly.

So far no legislation has been introduced in Congress to make the subsidy permanent, though a year or so ago there was considerable support for a permanent subsidy from various quarters in the oil industry. The plan was adopted by the Office of Price Administration during the war as a means of avoiding a general increase in the ceiling price on crude petroleum, but since the end of OPA crude prices have risen sufficiently to wipe out the subsidy except for a small remnant applying to Pennsylvania-grade crude.

Congress has just voted funds to permit OWMR to continue to operate until June 30, 1947, its statutory expiration date, mainly for the purpose of liquidation. Commissioner Harold Stein told the appropriations committee that a small amount of legal and accounting work would be necessary in liquidating the stripper-well program after April 1, such as the formality of revoking the regulations and auditing final payments.

U. S. Gasoline Tax

THE decision of the House committee on ways and means to hold hearings some time this spring on all excise taxes opens a slight possibility for ultimate repeal of the federal gasoline tax and others in the group of so-called automotive excises.

It is almost certain that any tax reductions made by the present session of Congress will be confined to income taxes and perhaps a few adjustments in some of the more onerous wartime "luxury" taxes. However, a case may be built up for removal of the automotive taxes at the next general revenue revision, and to this end various interested groups are already preparing their evidence.

During the past few weeks several excise-tax studies have been published in Washington, some for, some against, removal of the automotive taxes. Most active for repeal are the American Automobile Association and the National Highway Users Conference. On the other hand, the Committee on Postwar Tax Policy, an independent group of economists, has recently distributed a book on "A Tax Program for a Solvent America" which recommends that the automotive and most other excise taxes be retained and that all excise taxes as a group should be counted on to supply about 25 per cent of federal revenue in normal years.

The federal gasoline tax was enacted as a "temporary" measure during the depression year of 1932, and at its present rate of 1½ cents per gallon it yields the government around $400,000,000 annually. The other automotive taxes, also supposedly temporary, have a total yield about equal to the gasoline tax. These are the taxes on lubricating oils, transportation of oil by pipe line, and sale of tires and tubes and of automobiles, trucks, motorcycles, and their parts and accessories.

The AAA says motorists have paid $6,000,000,000 in these "discriminatory levies" during the 15 years since they were enacted on a temporary basis. The Highway Users Conference claims that motorists paid 90 per cent of the $898,431,411 collected by this group of taxes during the calendar year 1946. It also estimates that during the first year of operation the purchaser of a new passenger automobile pays between $70 and $100 in federal excise taxes.

When the gasoline tax was first imposed, and almost every time it was renewed until the war broke out, Congressional leaders made outright declarations that it was purely a temporary tax to meet an emergency and that the federal Government had no intention of incorporating the gasoline tax into its permanent revenue structure. It was frequently stated that gasoline taxes should be left to the states, with the idea that they would be applied directly to highway construction and maintenance.

The federal gasoline tax, however, has no connection with federal expenditures for highways, since it goes directly into the general fund of the Treasury. The N.H.U.C. points out that since the first Federal Aid Highway Act in 1916 the Government has paid $3,700,000,000 for roads and collected $6,600,000,000 in gasoline and other motorist taxes. In a recent study submitted to Congress the conference insists that all the automotive excises be repealed immediately because they endanger state revenues and are unfair and discriminatory in that they are taxes upon a necessity of life.

The federal gasoline tax yielded $371,135,780 in the calendar year 1941, $336,684,643 in 1942, $265,303,271 in 1943; $328,597,298 in 1944, $424,585,162 in 1945, and $413,953,324 in 1946. The Treasury Department estimates that during the fiscal year ending June 30, 1947, the gasoline tax will yield $444,000,000, and during the 1948 fiscal year $486,000,000.

A Brighter Outlook

THE Army's fertilizer program has been cut back, and the liquefied petroleum-gas industry will be permitted to obtain more pressure tank cars, the White House has announced after a survey of the fertilizer program which has involved a series of controversies among federal agencies and at the Capitol.

The new program, announced by

(Continued on page 117)

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To Pennsylvania's oil industry, America acknowledges a debt of gratitude. The Keystone state taught us to use petroleum and its products. "Drake's Folly" of 1859 led to the first "long distance" pipe line (5 miles of 2" pipe), the first trunk line (a 4" line from Oil Creek to Pittsburgh), and a trans-Allegheny line to carry this black gold to eastern markets. Until 1895 Pennsylvania ranked No. 1 in oil.

Today, in Pennsylvania's multitude of shallow wells there is strength. This state holds 12th place in production. Today its 83,640 wells are producing almost exactly at the state's 87-year average. Today its oil continues to make a major contribution to our national economy as it has for more than three-quarters of a century.

Pennsylvania expects to continue as an important oil producer for years to come. Through more than half its colorful oil history, Youngstown has served it with casing, tubing and line pipe. In the future, as in the past, oil operators, whether in Pennsylvania or any other part of the World, can continue to rely confidently on the dependable orange-banded pipe, drill pipe, casing, tubing and line pipe from Youngstown.

Identify Youngstown Oil Country Tubular Goods by the orange band or bands

PUT A *Stop* TO EVAPORATION LOSSES

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All petroleum products with volatile components should be handled under pressure to guard against evaporation losses and fire hazard. The degree of volatility is the determining factor in the choice of the type of storage tank used. Chicago Bridge & Iron Company builds a *complete* line of pressure storage tanks for all volatile liquids. The Hortonspheroid is recommended for hydrocarbons ranging in volatility from motor gasoline to natural gasoline. (A 10,000-bbl. Hortonspheroid designed for a working pressure of 15 lbs. per sq. in. is shown below.) It provides positive protection from evaporation losses and fire hazard, is dependable, is easy to maintain and functions without operating expense. Full details and quotations on Hortonspheroids are available from our nearest office.

TABLE OF STANDARD CAPACITIES
indicating type of Hortonspheroid furnished for various pressures

CAPACITY IN BBLS.	WORKING PRESSURE LBS. PER SQ. IN.						
	2½	5	10	15	20	25	30
2,500	H	H	S	S	S	S	S
5,000	H	H	S	S	S	S	S
7,500	H	H	S	S	S	S	S
10,000	H	S	S	S	S	S	S
15,000	H	S	S	S	S	S	S
20,000	H	N	S	S	S	S	S
25,000	H	N	N	S*	S*	S	S
30,000	H	N	N	S*	S*	S	S
40,000	N	N	N	N	N	S	S
50,000	N	N	N	N	N		
60,000	N	N	N	N	N		
80,000	N	N	N	N	N		
100,000	N	N	N	N	N		
120,000	N	N	N	N	N		

S — PLAIN TYPE HORTONSPHEROID
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*Noded type is furnished if soil bearing does not permit use of smooth type. Intermediate sizes and pressures can be furnished.

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Chicago, 4.....2128 McCormick Bldg.
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Los Angeles, 14.....1423 Wm. Fox Bldg.
Atlanta, 3.....2154 Healey Bldg.
Birmingham, 1.....1536 North 50th St.
Tulsa, 3.....1606 Hunt Bldg.
Houston, 1.....5619 Clinton Dr.
Philadelphia, 3.....1615-1700 Walnut St. Bldg.
Havana.....402 Abreu Bldg.
San Francisco, 11.....1254-22 Battery St. Bldg.
Detroit, 26.....1514 Lafayette Bldg.

REPRESENTATIVES AND LICENSEES

Chicago Bridge & Iron Company, Limited, Apartado 1348, Caracas, Venezuela
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Horton Steel Works, Limited, Fort Erie, Ontario, Canada
Wheatco, Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland

Texas, Shell Pipe Line to Build 500-Mile West Texas Artery

PLANS have been revealed by The Texas Pipe Line Co. and Shell Pipe Line Corp. for the construction of a 500-mile crude-oil pipe line having a normal carrying capacity of 150,000 bbl. daily and extending from the Permian basin in West Texas and Southeast New Mexico to Cushing, Okla.

In making the joint announcement T. E. Swigart, president of Shell Pipe Line Corp., and R. B. McLaughlin, vice president and general manager of The Texas Pipe Line Co., stated that the projected carrier would be the largest U. S. crude-oil line yet constructed with private capital.

The new pipe line, which is expected to be completed in the first half of 1948, will help greatly in relieving the present critical situation in West Texas where crude production is now limited by lack of pipeline outlets, the officials said.

The proposed line will originate at Jal, N. M., and then proceed, via Wink, Midland, Westbrook, and Wichita Falls, Tex., to Cushing. Jal and Wink are key junctions of Texas-New Mexico Pipe Line Co. Wink and Westbrook are junctions on the Shell system, Wichita Falls being a junction of The Texas Pipe Line System.

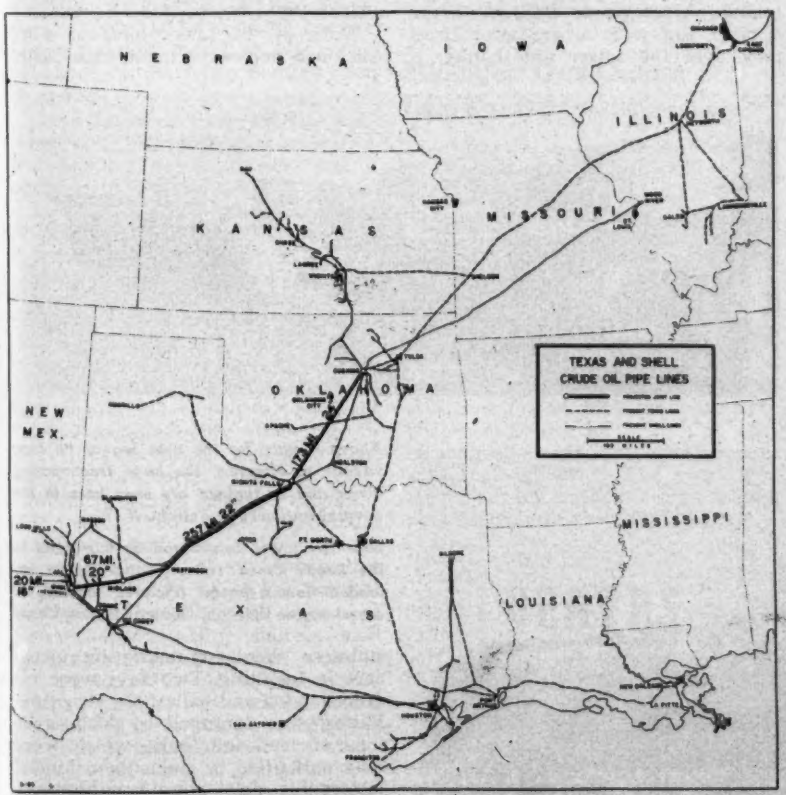
At Cushing connections will be made to the Texas-Empire Pipe Line Co. which operates to Lockport and Lawrenceville, Ill., and East Chicago, Ind.; to the Shell Pipe Line Corp. which runs to Wood River, Ill.; and to other connecting carriers. At Wichita Falls some of the West Texas crude will be delivered from the line for movement into the Houston-Port Arthur area. Here also North Texas crude will enter the line for movement to Cushing and delivery to connecting carriers.

The line into Midland will be 20-in. in diameter. The next and longest segment will be 22-in. in diameter and will extend 251 miles from Midland, via Westbrook, to Wichita Falls. The 24-in. segment will carry the increased load of crude 173 miles from Wichita Falls to Cushing.

Modern-type pumping stations will be located at Jal, Wink, Midland, and Wichita Falls. Present plans call for centrifugal pumps driven either by diesel engines or electric motors, depending upon availability of equipment and power supplies. The erection of seventeen large steel storage tanks will commence in June 1947. These tanks, of latest design, were ordered especially for this project.

Work on the carrier will be started as soon as the necessary materials are available.

The line will be jointly owned, with The Texas Pipe Line Co. owning 53 per cent, Shell Pipe Line Corp. 33 1/3 per cent, and other interests 13 2/3 per cent.



Present systems of Shell Pipe Line Corp. and The Texas Pipe Line Co. and the projected new crude line from West Texas to Cushing, Okla.

Report Describes Core Saturation Apparatus

WASHINGTON.—Apparatus developed by the U. S. Bureau of Mines in cooperation with the State of Oklahoma and now in use for the simultaneous determination of oil and water saturation of oil-field cores, is described in a new bureau publication.

The method employs a single, continuous distillation-extraction process in which water in the core sample is evaporated by vaporizing toluene, and the oil in the sample is dissolved by the condensed toluene returning to the heating flask.

Toluene, which is reclaimed by redistillation, serves a double purpose in the core analysis. Vaporized toluene drives out the water in the sample, and both vapors are conducted to a water-filled refluxing condenser where the two immiscible liquids condense into a graduated trap. Toluene, being the lighter of the two, overflows into the heating flask, first passing through the selected core sample and dissolving the contained oil and carrying it also to the heating flask.

The oil saturation is determined from the loss in weight of the core sample after making allowance for the volume of water collected in the graduated trap. Precise and speedy weight measurements are important factors and cleanliness of the glass equipment is essential, according to the authors of the bureau publication, Cleo Griffith Rall, junior chemist, and D. B. Taliaferro, senior petroleum engineer, both of the petroleum experiment station at Bartlesville, Okla.

Although reasonably accurate determinations can be completed in about 2 hours, more precise calculations have been made in Bureau of Mines core laboratories by extending the distillation-extraction heating period to 24 hours.

The report is available free from the bureau in Washington.

New construction under way in Indiana Standard's refinery near Kansas City, Mo., is seen in the lower left of the above aerial photograph made by a Kansas City Star photographer. In the background is the old refinery area

Expansion Program at Sugar Creek Refinery

SYMBOLIC of postwar expansion throughout the refining industry is the multimillion dollar program under way in the Sugar Creek refinery of Standard Oil Co. of Indiana near Kansas City, Mo.

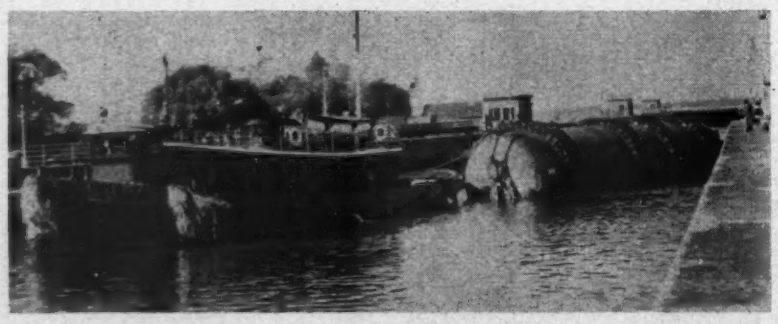
Included in the construction plans at the refinery are a new catalytic-cracking unit with a daily capacity of 25,000 bbl. of gasoline and other products, a vapor recovery and polymerization unit, water intake and floating pump station, cooling tower, additional water-treating equipment, and seven additional 80,000-bbl. storage tanks.

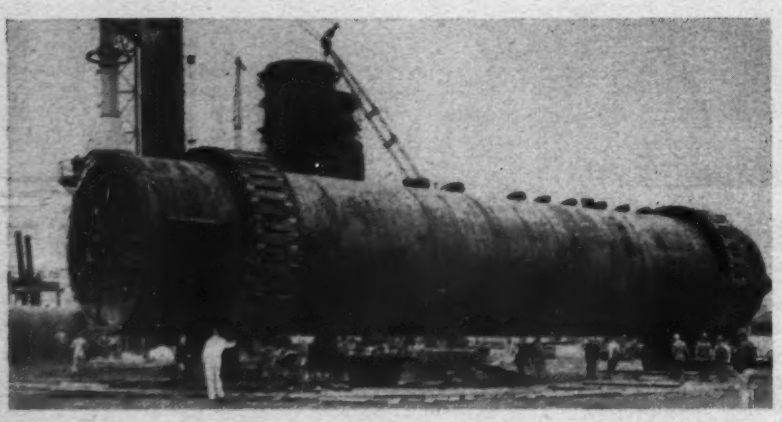
More than 1,000,000 cu. yd. of earth were moved in the new 90-acre tract to the west of the main refinery, which was acquired by Standard to make its expansion program possible.

One of the latest additions to the plant is a 165-ton fractionating tower for the catalytic-cracking plant. The tower, manufactured by M. W. Kellogg Co. at its Jersey City Works, made its entire trip of more than 2,000 miles to the Missouri plant site by water.

In a 32-day voyage, the tower, which is 117 ft. long and has a diameter of 16 ft., was floated up the Hudson River and towed by a tug via inland waterways to Chicago. There a river tug with a shallower draft took over the tower and hauled it through the Illinois waterway to Seneca, Ill. There, because of the shallow depths of the upper Missouri River, the tower was taken out of the water and loaded on a barge. It continued its voyage to Grande, Ill., then up the river 375 miles to the refinery site.

Walls of the tower have a ⅞-in. thickness and were lined with ½-in. stainless steel, necessitating great care in handling. Two days were required to lag and ballast the structure. Ballast was arranged by loading 40 tons of sand into bags, which were only half-filled to make them almost immovable. In towing condition the tower weighed 200 tons and had a draft of 7½ ft.





Above: Ready for the next leg of its long voyage to Missouri, the huge fractionating tower and its tugboat are seen here in the government locks at Buffalo, N. Y.

Left: The tower is pictured as it arrived in the Sugar Creek refinery after being unloaded from a barge. (Pictures courtesy of diesel-engine division, General Motors Corp.)

Summer Demand Prospects Tighten Gasoline Market

GROWING evidence of a below-demand supply of motor fuel this summer, coupled with the almost universal expectation of an early advance in crude-oil prices, is giving additional strength to the active gasoline market.

Continued efforts of larger companies to improve their storage position for summer consumption were reported this week. In the Mid-Continent area and on the Gulf Coast spot-market and contract material appeared to be moving at fractionally higher levels.

In the New Orleans-Baton Rouge area, regular gasoline was quoted at 7 to 7⅛ cents, ⅛ cent higher. Texas Gulf Coast regular grade was 7 to 7¼ cents, up ⅛ on the high. Mid-Continent spot-market motor fuel was reported bringing prices ranging upward from 6⅞ cents for regular, though limited quantities were available slightly lower. Suppliers in the Mid-Continent and Midwestern areas were hard pressed this week to meet demand for burning oils. Little material of any kind was available. Indicative of the heavy demand, one Mid-Continent refiner reported selling No. 2 at 5¼ cents, and range distillate to a marketer for 5⅞ cents.

Suppliers were experiencing continued difficulty with tank cars. Deliveries were in many cases running hundreds of cars behind. One source described this situation as one of the governing factors in the present market for all products.

Where available, heavy fuel oil was moving in many cases at above market prices. A marketer reported unsuccessful efforts to find No. 6 for an eastern industrial plant at a $1.44-$1.45 per barrel price. Some refiners, now negotiating contracts to supply railroad residual, were attempting to obtain higher prices than the general $1.26 per barrel.

In North Texas, gasoline was tight with some odd cars occasionally found and said to be bringing the seller's own price. The tank-car situation was said to be as bad as that of several weeks ago.

New York market sources said kerosene and No. 2 remains weak in that section with various prices prevailing. Gasoline was unchanged, and some easing of the supply of residual, but with no price changes, was noted.

One commentary in the speculation over the possibility of a crude advance was last week's action of the Albany, Tex., Chamber of Commerce in resolving to petition purchasers of crude for an increase in price to $2.50 per barrel. Early last month, a group of royalty and producer associations met in Fort Worth and petitioned purchasers for $2 crude.

Cooper-Bessemer Adopts New Firm-Price Policy

Cooper-Bessemer Corp. has announced adoption of a firm-price policy, under which no prices quoted by the company will be increased above the price in effect on the day the order was received.

In a letter signed by H. G. Jones and H. L. Winger, general purchasing agents, the new price policy was described as "the best way to stop an increasing inflationary trend, even though this policy contains certain hazards in a heavy industry such as we are engaged in, where several months are required to manufacture a product after an order is received and where we are obliged to absorb further increases in labor and purchased materials."

Michigan Gas Output Sets Record in 1946

Natural-gas production in Michigan set a new record in 1946 with a total of 23,774,495,000 cu. ft., an increase of 475,947,000 cu. ft. over 1945.

Oil production showed a drop of 192,975 bbl. with a 1946 production of 17,074,518 bbl.

Shell Leases Office Space

Four additional floors in the Richards Building, New Orleans, La., have been leased by Shell Oil Co., Inc., in connection with the establishment of a regional office. The new office is a part of a Shell reorganization plan announced last November.

DEATHS

Walter W. Brown, 61, vice president of Smith Meter Co., died February 14 at his home in Los Angeles.

George Miller, vice president and member of the board of Magnolia Petroleum Co. before his retirement January 1, died February 16 in Dallas. He had been a vice president since 1939.

Franklin Bowers Archibald, 72, inspector for Hughes Tool Co., died February 17 at his home in Houston.

John Lester Known, 51, land man for The Texas Co. for 27 years, died February 13 in Houston.

Reese Allen Wolfe, 64, president of Wolfe Production Co. and vice president of Refugio Oil Co. and Vireca Oil Corp., died February 15 at his home in Houston. Wolfe was well known in oil circles, having brought in several oil and gas fields.

Elias Michael Stine, 70, early-day drilling contractor, died February 17 at his home in Tulsa. Stine many years ago organized Stine Drilling Co. and served for 15 years as its principal officer.

Charles M. Volpe, general transportation foreman in Colombia for Texas Petroleum Co., subsidiary of The Texas Co., was among the 54 victims of the crash February 15 of a Colombian Avianca airliner near Bogota, Colombia. Before being transferred to Colombia in October 1946, Volpe was district civil engineer in Midland, Tex.

Fred Scott, former Tulsa lease broker, died February 20 at his home in Valdosta, Ga.

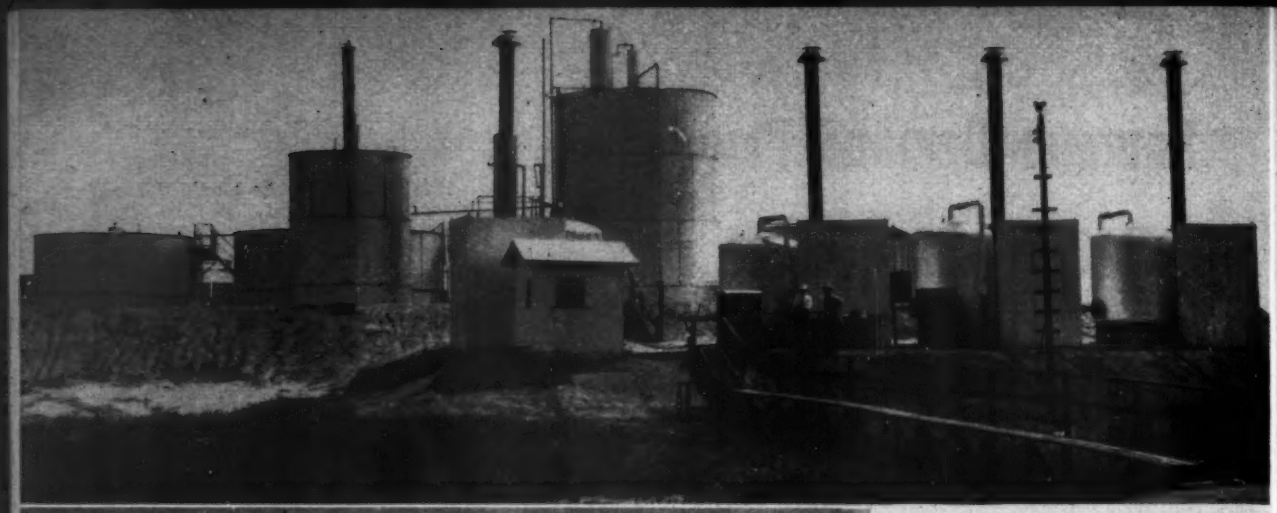
Jess O. Parks, retired drilling contractor, died February 21 in a Tulsa hospital.

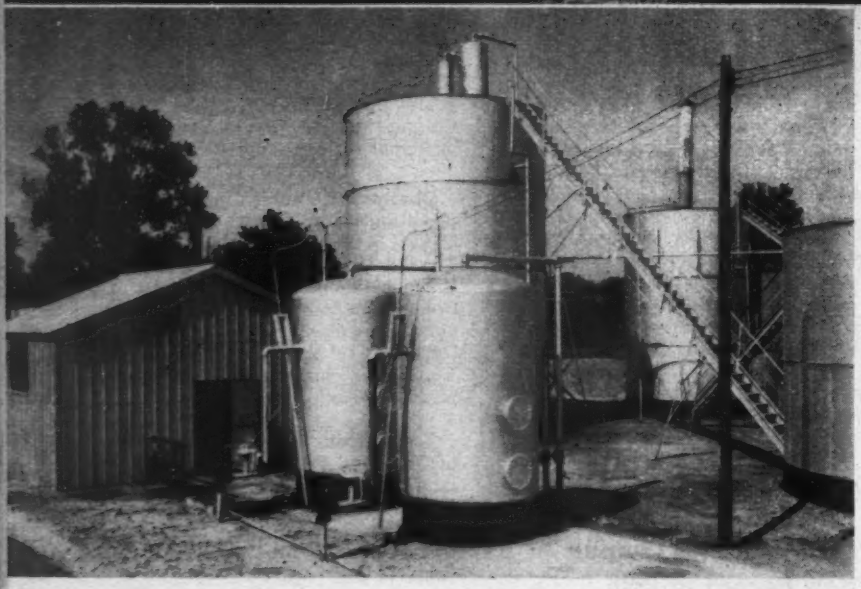
Henry J. Bess, 76, retired oil-field construction contractor, died February 21 in a Tulsa hospital. His home was in Glenpool, Okla.

C. Dwight Avery, 69, senior geologist of the U. S. Geological Survey, Washington, died at his home in Takoma Park, Md., February 1. Avery served for many years with the U. S. General Land Office and since 1920, when he became associated with the Geological Survey, had been engaged in the classification of mineral lands.

J. B. Hudson, 84, early-day driller, died recently at his home in Retsil, Wash. During his career he had drilled wells in Mexico, Burma, India, and Sumatra as well as various parts of the United States.

Col. R. W. Stewart, 81, former chairman of the board of the Standard Oil Co. (Ind.), died February 24 at a Miami, Fla., hospital. He had been in failing health for several months. He joined the Standard organization in 1907 and was prominent in its operations until his retirement in 1929. He is survived by his widow and four sons.





Above: Portion of Superior Oil Co.'s central treating plant in New Harmony field. In foreground are four of the battery of seven gas-fired direct oil heaters. Immediately behind them is one of the two 1,000-bbl. gun barrels with a 750-bbl. gun barrel at the left, and tankage in the background. Additional heaters, gun barrel, and tankage (not shown) are located at right

Left: Water knockouts (foreground) in which an initial separation of from 80 to 85 per cent of total water production is made. Back of them is one of the two 1,000-bbl. gun barrels, and in the rear a 750-bbl. gun barrel for separate handling of production from pooled acreage. Building at left houses two large centrifugal pumps for oil and water circulation

Central Treating Plant Performs Dual Function

by Nell Williams

ALL production from Superior Oil Co.'s leases in the New Harmony field in the Wabash River bottoms of Posey County, Indiana, and White County, Illinois, is being handled through a central treating plant providing not only for the separation of the oil but also for the further processing of the water output for formation injection purposes. Salt-water-treating facilities were placed in operation in February 1946. Originally, the water was treated primarily for disposal in water-bearing sands of the field. Since last September, the water has been utilized for injection as an auxiliary artificial flood drive in one of the field's various oil-producing reservoirs.

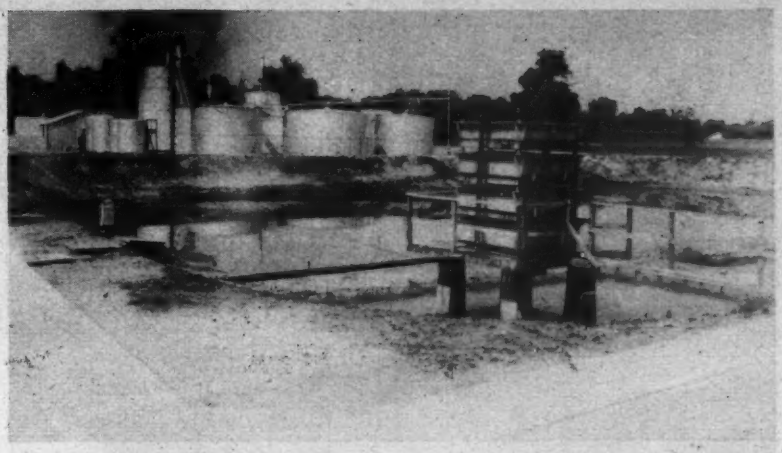
The reservoir into which the water is being injected is an isolated, low-pressure shoestring-type lens of the Waltersburg sand, lying at a depth of around 2,200 ft. Its productive area, embracing approximately 350 surface acres, is about 2½ miles long in a northwesterly-southeasterly direction and varies in width from about ¼ mile at the north to about ½ mile at the south end. It contains 17,600 acre-feet of productive sand, having an average thickness of 30 ft. with a maximum of 56 ft. Porosity runs about 20 per cent and permeability 526 md.

The lens was developed during 1939 and 1940 with a total of 46 wells being completed. Of these, Superior drilled 39 on two leases; Tide Water Associated Oil Co. 4 on one lease, and Sun Oil Co. 3 on one lease. The latter company since has abandoned one of its wells, leaving a total of 45 wells, including those now being used for injection purposes. The productive area was unitized in 1942 for the purpose of gas repressuring, which was started in June of that year. Operating interests in the unit are: Superior, 94.14 per cent; Tide Water 4.10 per cent; and Sun 1.76 per cent.

Low-pressure conditions have prevailed from the start. Original bottom-hole pressure was estimated at 990 psi., and during the early stages of development a few wells flowed naturally for short periods initially, but pressures declined rapidly to a point that all wells since have had to be produced by pumping. At the beginning of the gas-pressuring project, average pressure had declined to 100 psi., and at the start of the present water injection it was down to 85 psi. The oil is undersaturated and solu-

tion gas-oil ratios average only 20 cu. ft. per barrel. The sand dips into water at the southern limits of oil production, but cuts a fault about a mile southeast which eliminates the possibility of a natural water drive to aid in the recovery of the remaining oil in place.

It was estimated that ultimate recovery by primary production methods alone would be approximately 300 bbl. per acre-foot, or a total of about 5,280,000 bbl. It was then calculated that by gas injection an additional 80 bbl. per acre-foot would be recovered to give a total ultimate recovery of approximately 6,688,000 bbl. Up to the time the present water-injection project was started, total production was approximately 5,020,000 bbl., a recovery of slightly over 285 bbl. per acre-foot, leaving 1,668,000 bbl. to be recovered by primary production methods and gas injection alone. By augmenting gas injection with water injection, it is estimated that ultimate recovery will be increased to a total of 550 bbl. per acre-foot, or a total for the reservoir of 9,680,000 bbl. This will be 170 bbl. per acre-foot and 2,992,000 bbl. for the reservoir more than was expected by primary production methods and gas injection alone. Current production is at the rate of around 2,260 bbl. daily.

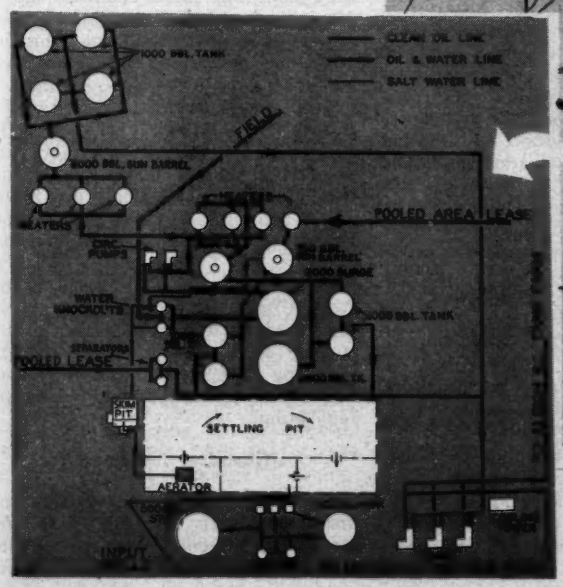


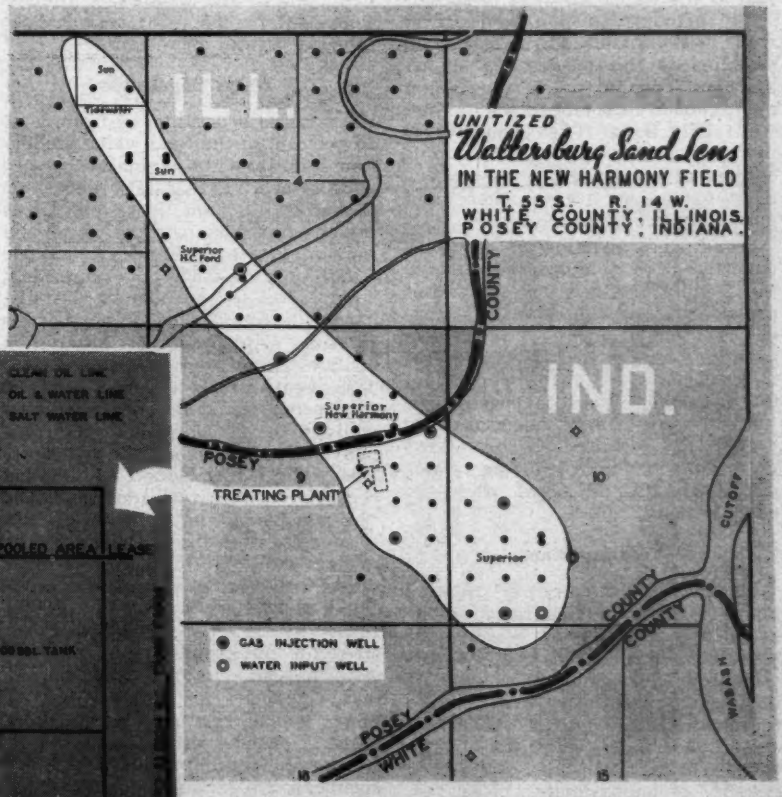
Coke tray aerator for oxidization of iron compounds. Raw water from skimming pits (not shown) at left is distributed over trays into underlying collection pit, from where it passes through a series of settling pits before going to chemical treating plant. Oil-treating plant appears in background

Gas Injection

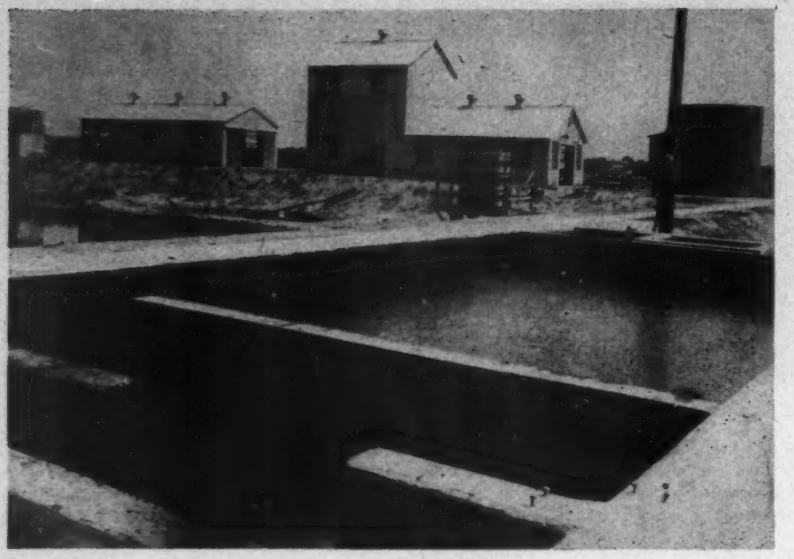
Up to the time the water injection was started, approximately 1,350,000,000 cu. ft. of gas had been put into the reservoir. The present rate of injection is about 1,260,000 cu. ft. daily, averaging around 180,000 cu. ft daily for each of the seven input wells being used. Gas for this purpose is taken from the field's 550-psi.-pressure distribution system supplied by residue from a natural gasoline plant operated by Warren Petroleum Corp.[1] Injection pressures range from 100 to 140 psi. Input wells are located around but inside the producing limits of the sand on the northeast, southeast, and southwest sides.

Water is being injected through two input wells (Nos. 10 and 28 New Harmony on accompanying map) located on the extreme southeastern edge. One of these wells (No. 28 Harmony) is a converted dry hole. The other is a former oil well in which the sand is at the present water level and which was showing a small percentage of water. The lens carries no bottom water and the only water to be produced will be that which





Left: Layout and flow diagram of Superior Oil Co.'s central oil-treating and water-stabilization plant in the New Harmony field Above: Map of Waltersburg sand lens producing area in New Harmony field showing producing and input wells



Skimming pits through which separated water production from knockouts and gun barrels passes. Oil seal is maintained on surface of water to prevent oxidization of iron compounds at this point. Aerator and portion of settling pits are visible at left. In rear are: left, pipe-line pump station; center, chemical treating plant, and right, 500-bbl. treated water storage tank

advances to successively higher wells as injection proceeds. It is proposed that as the water advances to successively higher producing wells, these wells will be shut down, and input switched to the successively higher locations. Present rate of injection is approximately 1,000 bbl. (500 bbl. per well) daily. So far it has been entirely by gravity flow although pumping equipment is installed at the treating plant for use in event higher input pressures become necessary.

Water for injection is obtained from the production of other sands in the field. Combined oil and water production from the company's various leases is pumped to the central treating plant from individual lease tanks, where the oil production of the respective leases is gaged. Two 1,000-bl. tanks are provided on every lease for this purpose. This allows one tank to be filled, the water settled, and the oil gaged, while the other is being run.

Treating Plant

Location of the central treating plant is within the confines of the productive area of the Waltersburg sand lens in which the water-injection project is being undertaken. At this time, production handled through the plant totals about 5,600 bbl. of oil and 1,100 bbl. of water daily. The water-treating plant has a filtering capacity of approximately 5,000 bbl. daily, allowing a substantial capacity margin for any possible future increases in water production. Although the volume of water which can be processed is limited to the capacity of the filters, other facilities are designed to treat up to 9,800 bl. daily, and by the installation of additional filters, the plant capacity can thus be further increased.

Water Separation

An initial separation of from 80 to 85 per cent of the total water production from the field is obtained in two parallel-operated water knockouts located at the plant. This water flows directly to skimming pits. The oil and remaining water flows from the knockouts to a 2,000-bbl. surge tank, from where it is pumped through heaters to two 2,000-bbl. gun barrels for final separation. The installation contains seven large-sized, gas-fired direct heaters. One of these is reserved for production of water-yielding wells in the pooled area of the company's New Harmony Realty Corp. lease, which production is handled separately through an additional 750-bbl. gun barrel and the clean oil run to separate stock tanks. Clean-oil producing wells on this lease are produced direct to the same stock tanks. Water settled out in the gun barrels flows by gravity in a combined stream to the skimming pits with the water separated initially in the knockouts. Chemicals fed into the streams to the gun barrels facilitate breaking of emulsions and settling of the water. At present approximately 15 gal. of chemicals are required daily.

Clean-oil stock tanks at the plant include one 2,000-bbl. and six 1,000-bbl. tanks for the production of all leases except the unitized New Harmony Realty Corp. lease, and two 1,000-bbl. tanks for production from the latter lease. The multiple circulating duty, including the processing of water and oil production through the heaters, retreating a tank of bad oil and transfer of oil from one tank to another, etc., is performed by two large centrifugal pumps. A separate pipe-line station with three booster pumps at the plant transfers the clean-oil production to the company's tank farms, one at Albion, Ill., and the other at Mount Vernon, Ind.

Settling Operation

Raw water from the oil skimming pits is pumped initially over an "aerator" in which iron compounds are oxidized from their ferrous state for removal in settling pits. The pump at the skimming pits is operated by a float control which maintains a desired water level in the pits, and thus prevents them from being pumped dry should water source to the pits be cut off. Water in these pits is held under an oil seal which prevents oxidization and settling of iron compounds at this point. The aerator contains four 5-ft.-square slotted coke trays through which the water is distributed downward into a basal collecting basin. It is set up over the initial settling pit into which the water from the collecting basin overflows. A balanced valve on the water controller at the skimming pits is set to maintain a water discharge pressure over the aerator of from 15 to 20 psi., and closes entirely if the pressure for any reason should exceed 30 psi. From the initial settling pit, the water flows successively through one large and two smaller pits, linked by baffled openings, and thence to a final sump for pickup to the chemical treating and filtering plant.

Treating is by the Infilco process and utilizes sodium hypochlorite, alum, and lime as the chemical agents. Mixing of chemicals and separation of sludge particles and clarified water are performed in an "accelerator." This is a vertical, cylindrical 500-bbl. capacity tank, divided on the interior by a conically shaped baffle assembly into primary (inner) and secondary (outer) mixing and reaction chambers. Chemicals are added and reactions take place in the inner primary reaction zone in the presence of previously formed sludge or slurry recycled from the secondary mixing zone. Under these conditions, resulting precipitation takes place on the surface of the old particles and the resulting flocculent or granular product is almost immediately ready for separation.

Chemical Treatment

Chemical mixers and feeders are installed directly above the accelerator tank in a second story room of the treating building. All control instru-

ments for the operation of the unit and feeds also are concentrated in this room. The sodium hypochlorite is fed by a proportioner directly into the raw-water receiving tank, also on top the accelerator. Water level in the receiving tank and rate of flow to the primary mixing chamber are automatically controlled. The alum and lime are added in the primary mixing chamber by two dry chemical feeders. Motor-driven impeller blades in the primary mixing chamber slowly stir and mix the entering raw water and chemicals in the presence of the four to five volumes of recirculated slurry from the secondary reaction zone. Circulation is created which passes the rising water and slurry over the top into the outer and secondary reaction zone, where continued sludge brings the treatment reaction to equilibrium for solids separation.

Filtering Process

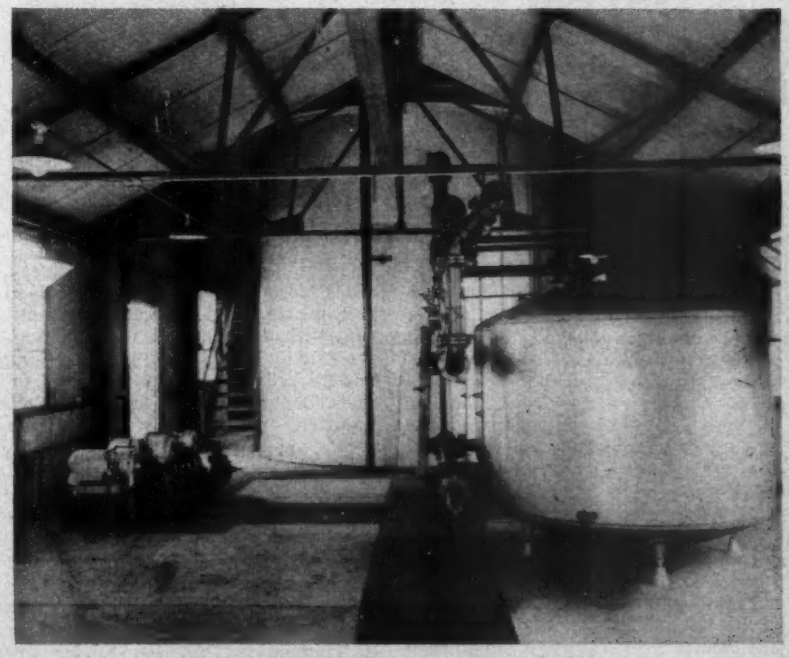
Leaving the secondary zone, the water-slurry mixture is discharged outward and downward in rapid directional motion from which a volume of treated water is displaced upwardly by an equal volume of incoming raw water with the remaining three to four volumes of circulating slurry returning around the bottom to the primary mixing zone. Separating the treated water in this manner, a directed flow and dynamic separation, takes advantage of the fact that solids in suspension in a fluid in motion do not readily change direction because of their inertia. Consequently, while the clarified, treated water rises, the heavier suspended solids tend to continue with the direction of flow. The rising clarified water is drawn off the top to the filters. Solids formed in excess of the concentrations desired in the circulating slurry are removed by means of sludge concentrators, which are in zones of quiescence around the outer edge in which the sludge readily settles and discharges through the sludge pickup system to a waste pump.

Flow of the clarified water to the filters is by gravity. Filters are of the closed type and operate under a maximum working pressure of 50 psi., supplied by the gravity head. Anthrafilt is used as the filtering medium. Two filters are installed, each having a filtering rate of approximately 100 g.p.m. These are operated alternately, allowing for backwashing one while the other is in service. Filtered water is discharged under the gravity head to a 500-bbl. storage tank, from which it is directed to the input wells for reservoir pressuring or to disposal wells. Gravity flow from the storage tank at present provides sufficient pressure (100 to 140 psi.) for injection purposes. However, as previously stated, a motor-driven centrifugal pump has been installed for use when needed. Three such pumps have been provided, one being reserved for input service, another for picking up the raw water from the settling sump to the accelerator receiving tank, and the third for circulating clear water from the storage tank to backwash the filters.

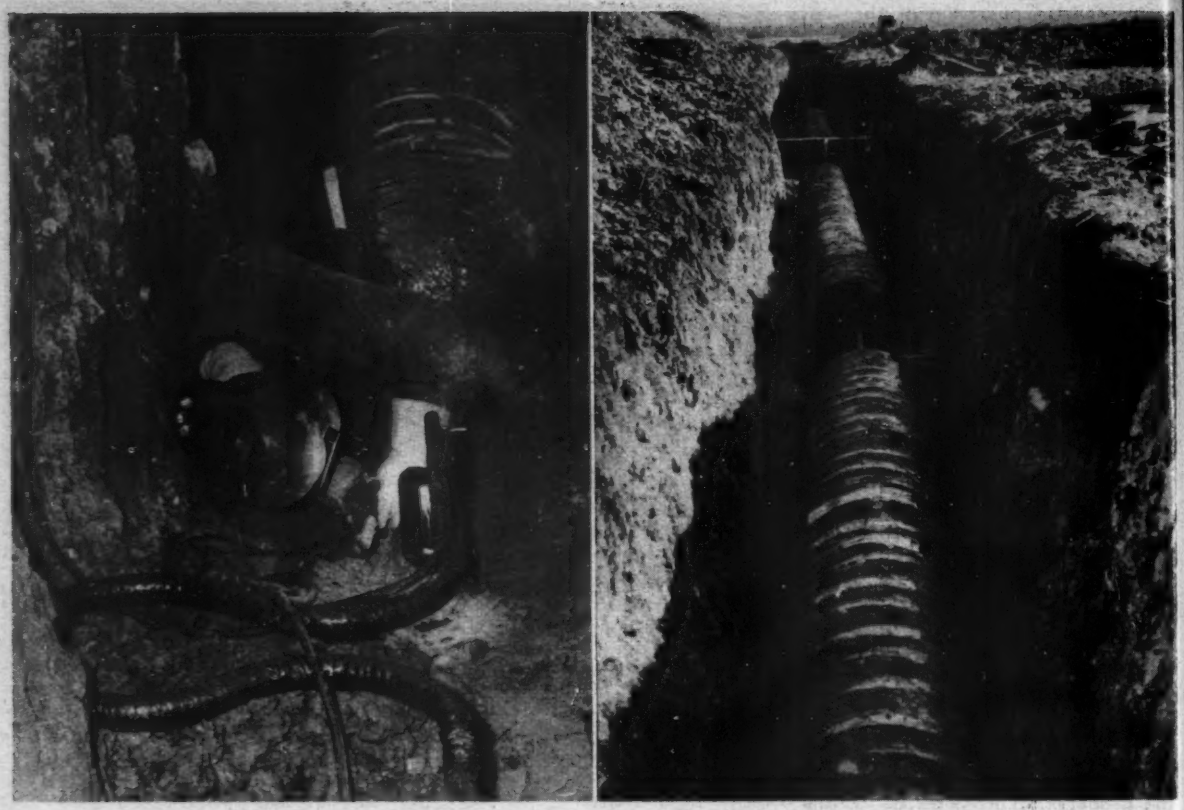
Chemical feeders in chemical room above top of "accelerator" mixer and clear water separator. At left are two dry-chemical feeders, one for alum and the other for lime. Square tank in center is raw-water receiving box with sodium hypochlorite feeder on top. At rear is hypochlorite mixer. Installation on floor in front of receiving tank is motor drive for accelerator impeller

Reference

1. Harts, H. W., Griffin-New Harmony Operation, a Cooperative Success. The Oil and Gas Journal, October 29, 1942, p. 59.



Ground floor room of chemical treating plant showing accelerator tank at rear with two closed water filters at right. Three motor-driven centrifugal pumps at left are for: pickup of raw water from settling pits to top of accelerator, backwashing of filters, and pumping of treated water to input wells



Left: Installing an expansion bend between two lengths of special pipe. Right: Special pipe installed and ready for backfilling.

Natural Gas Stored in Buried Pipe at 2,240 Lb.

by C. R. Claxton,* M. G. Markle,† and D. V. Meilert‡

THE Public Service Co. of Northern Illinois recently placed in service near Kankakee, Ill., a natural-gas-storage installation of a design developed in its organization, consisting of 50 lengths of steel pipe, each 40 ft. long and 24 in. in diameter, and in each of which 25,000 cu. ft. of natural gas is stored at 2,240 psi.; the 50 lengths have a total storage of 1,250,000 cu. ft.

This installation, while useful and necessary for continued reliable gas service to the Kankakee area, is also a "pilot plant" installed to demonstrate the advantages and determine any faults preparatory to making a much larger installation. The gas load of Kankakee and adjacent communities, with 9,200 customers, is increasing rapidly because of the increasing population, greater use of gas for space heating, and an influx of new industries.

The normal supply of gas to the area is through a high-pressure distribution feeder main from Matteson, Ill., some 30 miles north and east of Kankakee. The distribution in the Kankakee area consists of a central low-pressure natural-gas system where a carbureted water-gas plant with two 6-ft. sets and a 500,000-cu. ft. commercial lift-type holder are available for emergency use or peak shaving for the low-pressure system only, there being no compressors for returning gas to the high-pressure system serving the outlying areas and industrial customers. To assure, in the event of a temporary failure of the feeder main from Matteson, an emergency supply for high-pressure customers and additional protection for the low-pressure system, the additional storage of 1,250,000 cu. ft. in buried pipe was installed on the opposite side of the city from the normal supply through the feeder main from Matteson. The storage, together with the water-gas plant and the lift-type holder, can supply the maximum load of the area for the length of time which might be required to make emergency repairs to the feeder main from Matteson.

*Engineer, process division, Stone & Webster Engineering Corp. †Gas engineer, Public Service Co. of Northern Illinois. ‡Senior design engineer, Public Service Co. of Northern Illinois.

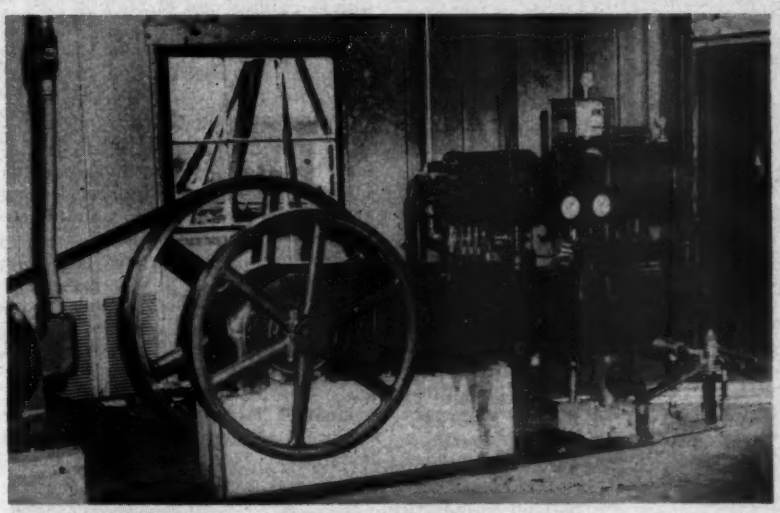
Compressibility Factor

Of particular interest is the effect, in this type of storage, of the compressibility factor or the deviation from the laws of perfect gases of the natural gas stored. Fortunately, the maximum deviation occurs near 2,240 psi. and is of such magnitude as to increase the storage capacity by more than 40 per cent over that of a perfect gas, the compressibility factor "Z" (PV = "Z" NRT) being less than 0.70 at 2,240 psi. and 40° F. Thus, whereas approximately 160 standard cubic feet of a perfect gas could be stored per cubic foot of space, approximately 230 standard cubic feet of

Tube-within-tube heat exchangers are used to heat the high-pressure gas with steam before reduction to distribution pressure

natural gas can be stored per cubic foot of space. This was dramatically demonstrated when 10 lengths of special pipe were pressured to 2,300 psi. with 187,000 cu. ft. of air whereas 260,000 cu. ft. of natural gas was required to pressure the same 10 lengths of pipe to 2,240 psi. Also, a high-pressure cylinder was pressured to 2,240 psi. with natural gas and the gas then carefully metered out in the laboratory. The metered volume was within 1 per cent of the calculated volume. The nominal storage capacity of the Kankakee installation is 1,250,000 cu. ft.; however, the actual gross storage capacity is 1,396,000 cu. ft. at 40° F. storage temperature or 1,184,000 cu. ft. at 60° F. storage temperature. The net available gas from storage is approximately 25,000 cu. ft. less than the gross storage.

The operating pressure of 2,240 psi. conforms to the A.S.M.E.-A.S.A. code for pressure piping, Section 2, Division 2, and is 80 per cent of the mill test pressure of 2,800 psi. All piping other than the 24-in. special pipe conforms with Section 2, Division 1, of the code for pressure piping. To withstand these high pressures, the special 24-in. o.d. seamless heavy-wall



Three-stage compressor for filling the special pipe has a capacity of approximately 6,000 cu. ft. per hour

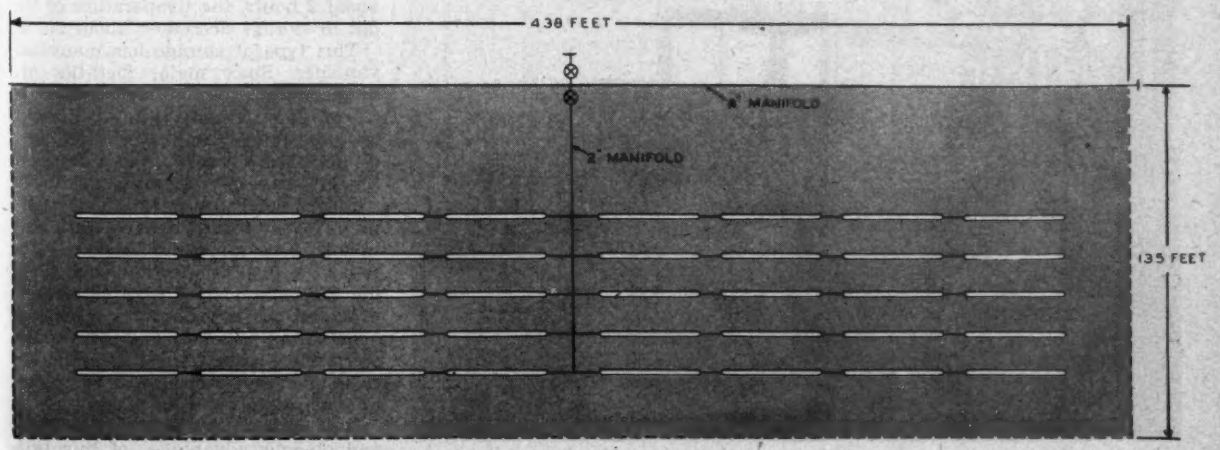


Fig. 1. General layout for storage of natural gas at 2,240 psi. in buried pipe. The forty 40-ft. lengths of special 24-in. pipe have a nominal storage capacity of 1,000,000 standard cubic feet

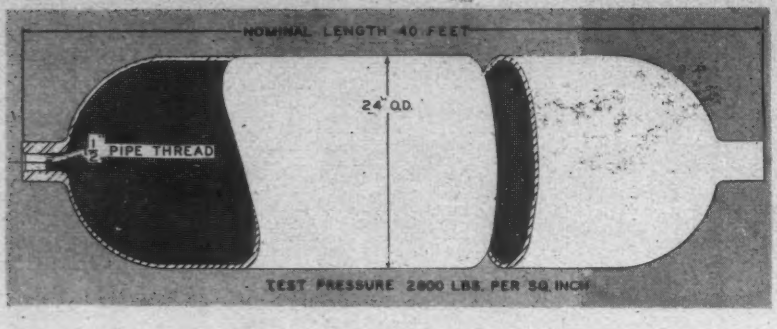
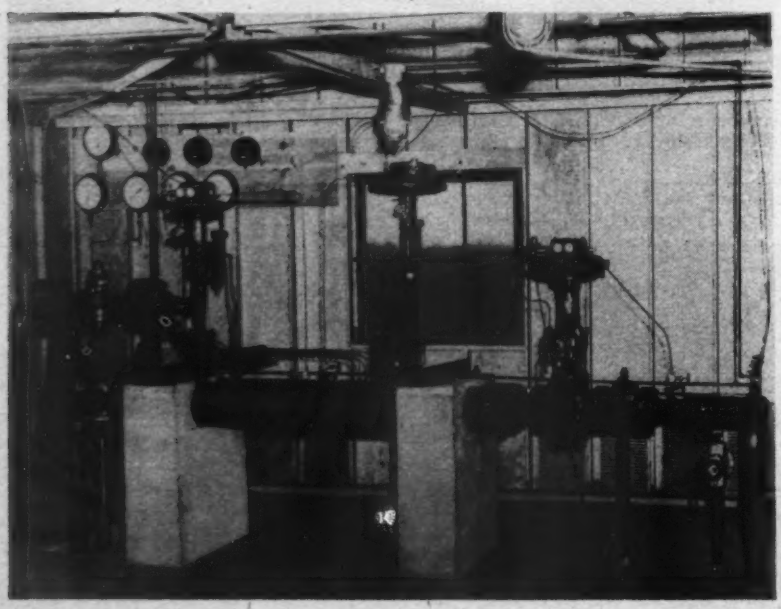


Fig. 2—Diagram of the special stainless-steel pipe

pipe was made of A.P.I. N-80 steel which has a yield point of approximately 80,000 psi. The pipe has a minimum wall thickness of 0.448 in. and weighs approximately 5,000 lb. per 40-ft. length. In order to avoid field welding of the N-80 steel, each length of pipe, before shipment to the job was swedged down on both ends, the ends rough bored, the pipe stress relieved and tapped on each end with a 1½-in. thread to A.S.A. specification B 2.1, 1945 Appendix J. Each length was hydrostatically tested to 2,800 psi. in a water-filled jacket, which procedure permitted the detection of any pipe in which the yield point was exceeded under test. The 50 lengths of pipe installed at Kankakee averaged 39 ft. 6¾ in. in length, and the average internal volume as determined by weighing when empty and when full of water was 109.66 cu. ft.

The arrangement of the special pipe was as shown in Fig. 1 which illustrates the spacing and arrangement of 40 lengths, which makes up a "standard" 1,000,000-cu. ft. unit of storage. The spacing between lengths of pipe was selected so as to facilitate installation, and so that a failure of any special pipe will not disturb adjacent pipes. The special pipes were spaced 8 ft. end to end and 15 ft. center line to center line. At Kankakee 40 lengths were installed as in Fig. 1 and the other 10 lengths were installed as a part of a future "standard" 1,000,000-cu. ft. unit. Two valves are installed in the field, one a shutoff for the standard 1,000,000-cu. ft. unit, and the other a shutoff for the 10 lengths of pipe which in the future may be a part of a second standard 1,000,000-cu. ft. unit. The special pipe has 3 ft. 6 in. of cover to minimize seasonal temperature changes. All underground piping is coated and has cathodic protection.

The storage installation consists, in addition to the buried special pipe, of a compressor for filling the special pipe, regulators for withdrawing the gas, and a boiler and heat exchanger for heating the gas prior to pressure reduction. Since this installation is primarily for emergency use, and quick refilling is not considered essential, the compressor was selected on the basis of availability rather than capacity. The compressor is three stage with intercoolers but no aftercooler, and has a capacity of approximately 6,000 cu. ft per hour at 40 psig. suction pressure A 40-hp. motor drives the compressor with V-belts. The regulators and heat exchanger are designed for a withdrawal rate of 125,000 cu. ft. per hour The regulation which is in three steps 2,240 to 450 lb. to 150 to 40 lb., has interstage receivers equipped with relief valves. "Choke run" bypasses around the first two stages permit maintenance of flow rate as storage pressure decreases. A cast-iron gas-fired boiler with 590,000 B.t.u. per hour input provides low-pressure steam for heating the gas ahead of the regulators.



Regulators reduce pressure in three steps, from 2,240 psi. storage pressure to distribution pressure

Operating Experience Satisfactory

Operating experience to date has been satisfactory. The piping was tested with air at full operating pressure prior to introduction of gas, in order to facilitate safe repair of any leaks. No leaks were found in the 1½-in. threaded joints in the ends of the special pipes. These threads and the 1½-in. male threads of the 1½-in. expansion bends connecting the special pipes were accurately cut and were carefully gaged with special gages, both at the mill and in the field, and field makeup of these joints was carefully supervised. Sample threaded joints had been previously tested and found tight under 3,000 lb. gas pressure. Only one leak was found in a weld and no leaks were found in a ring-gasket flanged joints. A number of leaks were found at threaded joints made with ordinary pipe threads. Almost all such joints were then back welded to insure tightness. Although no aftercooler was used, the temperature of the special pipe rose very little during filling. During a test in which the storage pressure was reduced 1,200 lb. in about 2 hours, the temperature of the gas in storage decreased about 30° F.

This type of storage has many advantages. Since major facilities are underground, they are not subject to storm damage, are little influenced by atmospheric conditions, and there is no hazard to or from aviation. Since storage is in many small units, storage capacity may be added easily in any increments desired, and any unit may be taken out of service for repair or inspection without disturbing the remainder. A high percentage of stored gas is instantly available at distribution pressure. The investment, operating costs, and maintenance costs are very attractive as compared to some other types of storage.

It is anticipated that the flexibility and obvious advantages of this type of storage will make it quite popular for certain locations and conditions.

Control of Per Interval Producing Rates

*by Park J. Jones**

OIL PRODUCTION by water

PART 15 OF A SERIES

THE pay intervals in the R-2 reservoir of Part 14 are used to show that control of per-interval producing rates is a significant factor in production. Several conditions are investigated and it appears that control of producing rates depends primarily on isolating production by intervals.

The Rate of Depletion

THE rate of depletion R is plotted against cumulative recovery in Fig. 15-1. The recoverable oil for the (a) interval is (43.2 — C) million barrels at the time the cumulative recovery is C million barrels. The rate of depletion at any time is $365Q_a/(43.2 - C)$ where Q_a is the producing capacity of the (a) interval. The initial rate of depletion is about 3.5 per cent per year of the recoverable oil. The rate of depletion increases up to about 17.1 per cent when the cumulative recovery is 40 million barrels.

The recoverable oil for the (b) interval is 111.4 million barrels. The initial rate of depletion for the (b) interval is about 3.2 per cent per year. The rate of depletion increases up to about 14.2 per cent per year when the cumulative recovery is 100 million barrels.

*Production consultant, Houston.

The producing capacity per barrel of reserve is faster for the (a) interval than for the (b) interval. This point is also illustrated by the curves in Fig. 15-2. As edge water changes to bottom water, reservoir producing capacity per barrel of reserve increases very rapidly.

Control of Producing Rates

The ratio of producing rates at MER from the (a) and (b) intervals is about 2.4 during the first 12 years. This ratio increases up to about 2.9 by the end of the thirtieth year. Control of per-interval producing rates is a significant factor for reservoirs in which intervals are interconnected structurally, stratigraphically or via well bores. Premature contamination of oil by water decreases the rate of oil recovery when wells are produced at capacity and increases operating expenses even if the rate of production is not reduced. From the viewpoint of a reservoir as a whole, there is no profit in producing water unnecessarily. It may be profitable to produce the bottom water which cannot be excluded from production. It may be necessary to produce water from some limestone reservoirs in order that oil can be recovered. But generally there is no advantage in producing water unnecessarily.

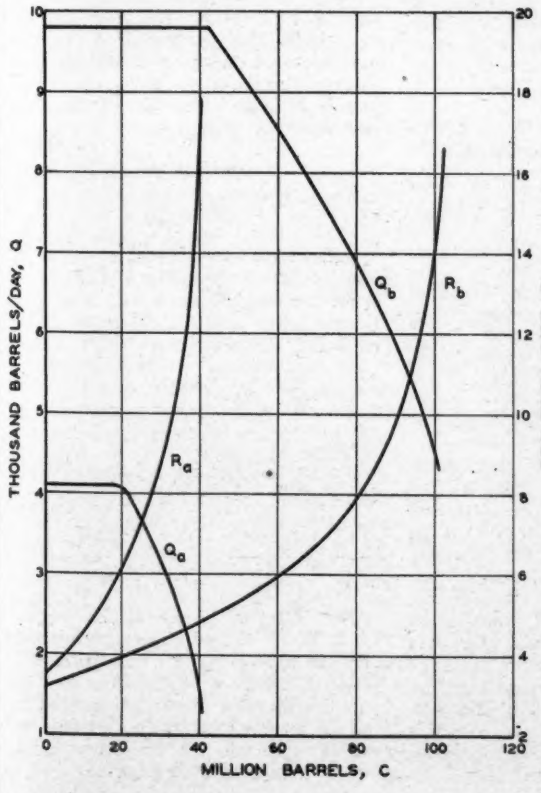


Fig. 15-1 — Producing capacity Q and depletion rate R vs. cumulative recovery from the (a) and (b) intervals of the R-2 reservoir produced at MER by water and 2.5 per cent expansion; depletion rate is in per cent per year of recoverable oil

The simplest control of producing rates is through isolating production by intervals. However, such a control may not be practical from an economic viewpoint under some conditions. Corrosion, mechanical difficulties with dual flowing-pumping completions, unequal rates of water encroachment, per-well capacities, the number of wells, and other factors may be involved in the control of per-interval producing rates.

No Injection Wells

Suppose intervals (a) and (b) can produce entirely by water encroachment. Under this condition injection wells would not be required. If the impermeable break extends only a short distance downdip from the water contact, the pressure at the water contact is the same for both intervals. However, the pressure at the water contact may vary with time, that is, the reservoir pressure may vary.

Suppose intervals (a) and (b) are not interconnected either via the annuli between oil strings and formation or within oil strings. Then the required number of producing outlets N_a for the (a) interval is defined approximately by:

$$N_a = \frac{4{,}100\ \mu b \log 2d/r}{3.07\ [IhK\ (P - p)]_a} \qquad (1)$$

The required number of completions for the (b) interval is defined approximately by:

$$N_b = \frac{9{,}800\ \mu b \log 2d/r}{3.07\ [IhK\ (P - p)]_b} \qquad (2)$$

where P is the reservoir pressure and p is the bottom-hole operating pressure. The approximate value of log 2d/r is 4.6 for both intervals. The product of viscosity and volume factor is 3.11 for both intervals. The pay thickness for (a) is 20 ft. and for (b), 40 ft. Upon substituting these values, we have:

$$N_a = \frac{955}{[IK\ (P - p)]_a} \qquad (3)$$

and

$$N_b = \frac{1{,}142}{[IK\ (P - p)]_b} \qquad (4)$$

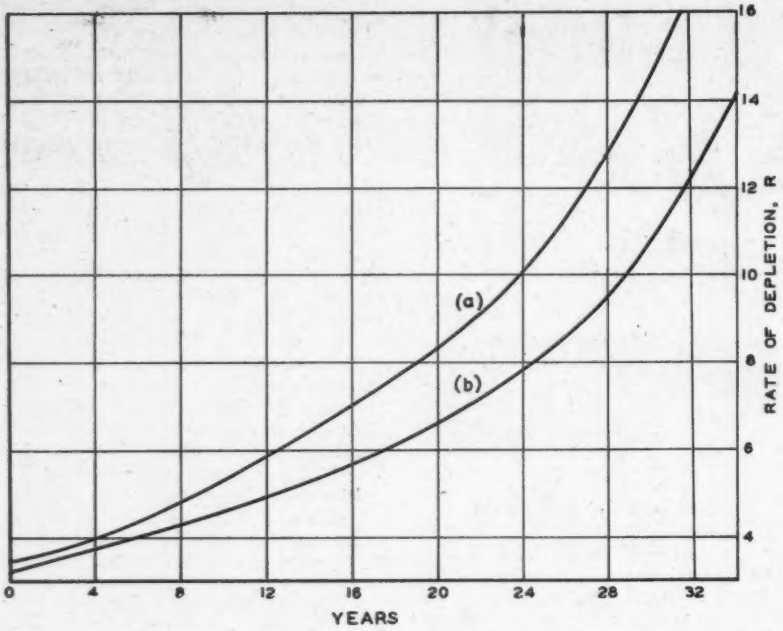


Fig. 15-2—Rate of depletion vs. time for the (a) and (b) intervals in the R-2 reservoir

When the drawdown, permeability, and interference factors are the same for both intervals:

$$\frac{N_b}{N_a} = \frac{1{,}142}{955} = 1.2$$

The (b) interval would require 1.2 completions per one completion in the (a) interval. The required producing rate per foot of well completion in the (b) interval is 1.22 times the required producing rate per foot of well completion in the (a) interval. Hence, the indicated ratio of completions is approximately correct.

The interference factor for a three-row equivalent system is on the order 0.262 if the number of completions does not exceed 60. Accordingly, the number of completions required by the (b) interval is defined approximately by:

$$N_b = \frac{4{,}360}{K\,(P - p)_b} \qquad (5)$$

Table 15-1 contains some solutions of Equation 5. The importance of maintaining reservoir pressure is evident from the well requirements. About 20 wells on a 180° radial reservoir constitute a two-row equivalent well system. The corresponding interference factor is 0.384. So the data in Table 15-1 showing fewer than 20 wells should be multiplied by 0.262/0.384 or about two-thirds. The interference between wells on a two-row system, or equivalent, is less than for a three-row system. The per-well average producing rate for the completions in the (b) interval is 9,800/N_b. Equation 5 should not be used if N_b is greater than 60.

TABLE 15-1—COMPLETIONS REQUIRED FOR THE (b) INTERVAL

Millidarcys	100	200	400	600	800
Bottom-hole pressure, psia.	Completions for reservoir pressure = 2,400 psia.				
1,200	36	18	...	...	...
1,400	44	22	...	...	...
1,600	55	28	14	...	...
1,800	...	36	18	...	...
2,000	...	55	27	18	...
	Completions for reservoir pressure = 2,000 psia.				
1,200	55	28	14	...	...
1,400	...	36	18	...	...
1,600	...	55	27	18	...
1,800	...	...	55	36	26

Total Number of Completions

The constant defining the number of completions for the (a) interval is 955/0.262 or 3,650. The limitations on this constant are the same as those for the (b) interval.

The total number of completions N for intervals (a) and (b) combined is given by:

$$N = \frac{3{,}650}{[K\,(P - p)]_a} + \frac{4{,}360}{[K\,(P - p)]_b} \qquad (6)$$

For instance, when the permeability is 400 md. for each interval and the drawdown 300 psi., the required number of outlets is 30 for the (a) interval and 36 for the (b) interval. The number of single completions would be 66. For dual completions, the required number of wells is 36 of which 30 would be dual jobs. The rate of production would average 4,100/ 30 or 137 bbl. per day from the (a) interval and 9,800/36 or 272 bbl. per day from the (b) interval. The total rate of production per dual well would average 410 bbl. per day.

Interconnection Via Wells

Suppose the intervals are interconnected via all wells. Production is not isolated and the bottom-hole pressure is the same for both intervals. Let the intervals be interconnected a short distance downdip from the water contact. For this condition, the ratio of well-feet of completion in the (b) interval to that in the (a) interval is given approximately by:

$$\frac{(Nh)_b}{(Nh)_a} = 2.4\,\frac{K_a}{K_b} \qquad (7)$$

where K_a is the average permeability of the reservoir-well system in the (a) interval and K_b is the corresponding value in the (b) interval.

Consider first a uniform permeability ratio, that is, $K_a/K_b = 1$. The pay thickness in the (a) interval where wells are completed is one-half the corresponding value in the (b) interval. When N wells are completed in both intervals, the producing rate from the (b) interval is 1/1.2 of what it should be. Accordingly, the number of wells to be completed in the (b) interval alone is 0.2N where N is the number of wells completed in both intervals.

More generally:

$$W_b = N\left(\frac{Q_b}{Q_a}\,\frac{h_a}{h_b} - 1\right) \qquad (8)$$

where W_b is the number of wells required in the (b) interval alone when N wells are completed in (a) and (b) having completion thickness in the ratio h_a/h_b and the required producing rates are in the ratio Q_b/Q_a. For instance suppose 40 wells are completed in both intervals of the R-2 reservoir. In this case:

$$W_b = 40\left(\frac{9{,}800}{4{,}100}\cdot\frac{20}{40} - 1\right) = 8$$

Equation 8 was derived on the basis of uniform permeability and interference factors as between intervals. Permeability ratios are seldom equal to unity, so we write:

$$W_b = N\left(\frac{Q_b h_a K_a}{Q_a h_b K_b} - 1\right) \qquad (9)$$

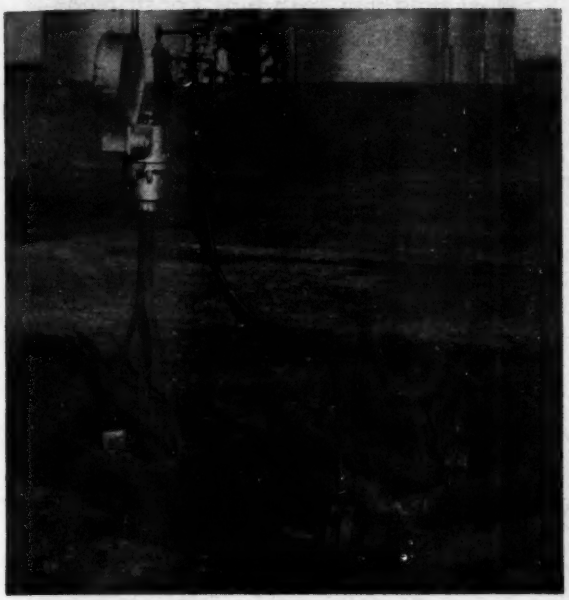
We have three possible conditions, namely:

$$\frac{K_a}{K_b} \le \frac{Q_a h_b}{Q_b h_a} \text{ or } \frac{K_a}{K_b} \ge \frac{Q_a h_b}{Q_b h_a} \qquad (10)$$

For instance, when K_a/K_b equals 1/1.2, W_b = O and the same number of wells is required for both intervals. When $K_a/K_b = 2$, W_b is equal to 1.4N and the number of wells required in the (b) interval would be 2.4 times for the (a) interval. On the other hand,

(Continued on page 85)

PLANT PRACTICES



Simple Support For Meter

FOR temporary installations, in the field and around a plant, a simple support for meters and the like often proves to be a valuable item. A variation from the ordinary types of meter supports used commonly in such services is the one shown in the photograph. The support was constructed in the field entirely from scrapped materials. Good stability is provided by the triangular-shaped base when the meter is mounted on the stand so that its clock is in line with one of the points of the triangle.

Handy Valve-Assembly Tool

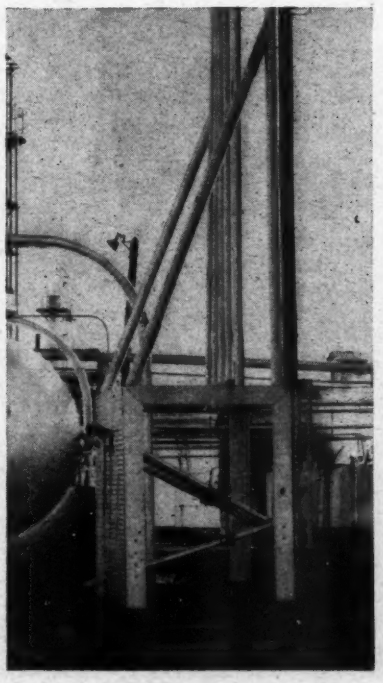
THE tool shown in the photograph simplifies the operation of making up and taking apart certain types of valve assemblies. Hardwood is used for the base of the tool to avoid injuring the machined surfaces of the sub-assembly. A piece of ¼-in. plate, attached to the wood base with lag screws and into which a slot is cut at its upper part provides the fulcrum. The lever is made of 1 by ⅜-in. bar with a hook at its fulcrum end and with a circular eye near its center. A ring, which is cupped to

prevent the valve spring from slipping out of position when it is compressed, is provided with two ¼-in. pins spaced 180° apart. These pins fit into rounded notches on the under side of the lever to form a pivoted bearing which allows the ring to rest squarely on the valve-spring washer when force is applied to the lever.

Positive Control of Combustion Gas Flow in Processing Furnace

LOCATED adjacent to the control house the plant-fabricated remote damper regulator, shown in the photograph provides positive control of the combustion gas flow in a processing furnace. The levers which regulate damper travel are made of 1-in. pipe and rotate about a common axis attached to the back legs of an angle-iron structure. Force for moving the dampers is transmitted by a small, flexible wire line which is inclosed in pipe conduits. The conduits for this particular installation may be seen running vertically from the lever support frame. The two pipes which extend diagonally from the frame to a pair of uprights serve as supports for the frame which carries the conduits.

In order to allow for roadway



clearance the vertical conduits run to some 20 ft. above grade in the area. Horizontal conduits, carried by a crossarm on the uprights, extend to the heater where the lines are run to the various dampers. An encased wire-line sheave such as used in popular-type tank-gaging systems is used for carrying the control line around corners.

Degree of opening on the dampers is controlled by the position of the levers. A notched slot in the plate on the front of the lever support allows positive setting of the levers at any position desired. In order to obtain equal lever travel at the control station, for all dampers, the levers attached to the dampers were lengthened or shortened as required. Through trial and error the positions of the control levers have been determined for any condition of firing and coil temperature desired in normal operation of the heater where this device is installed.

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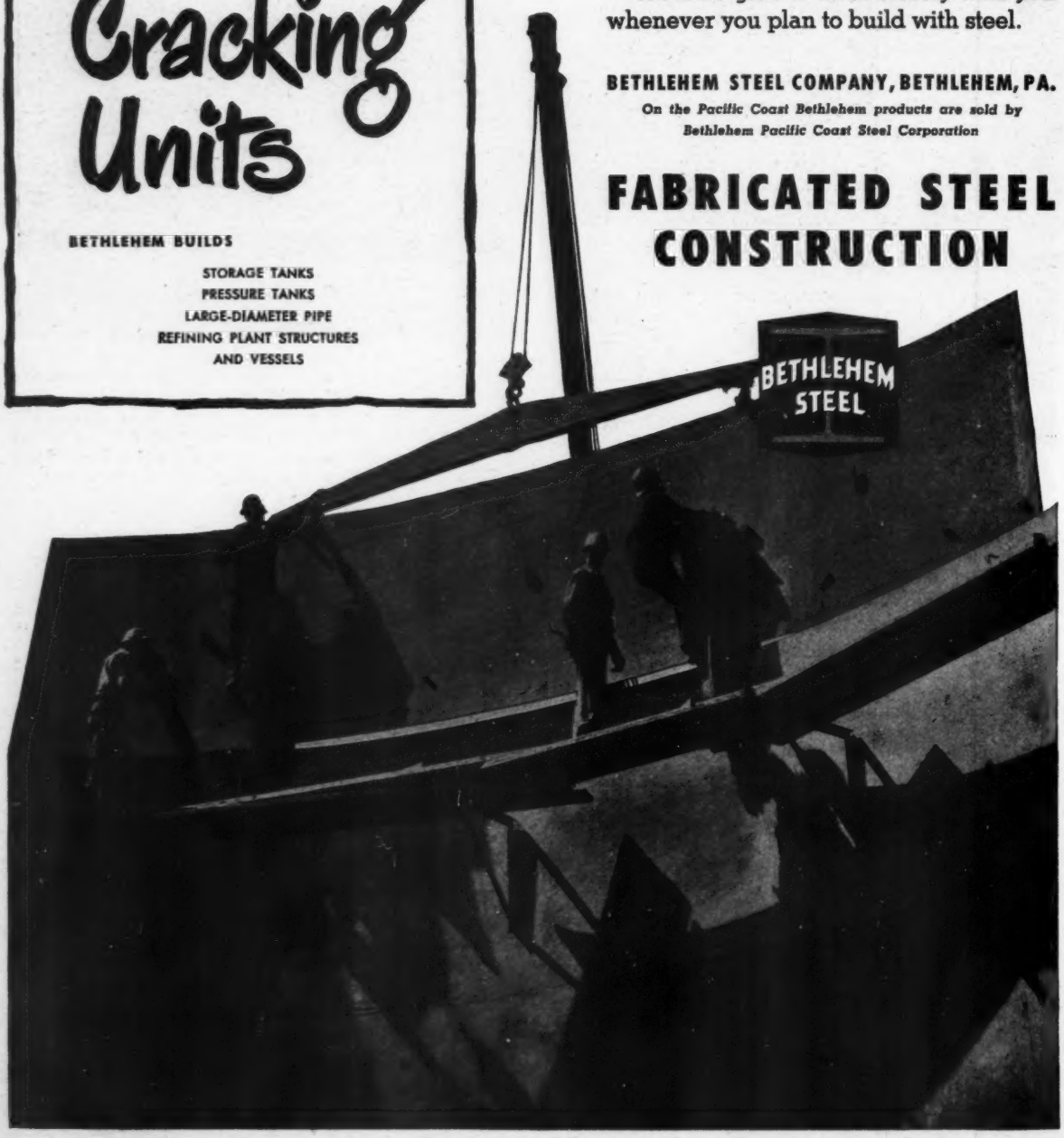
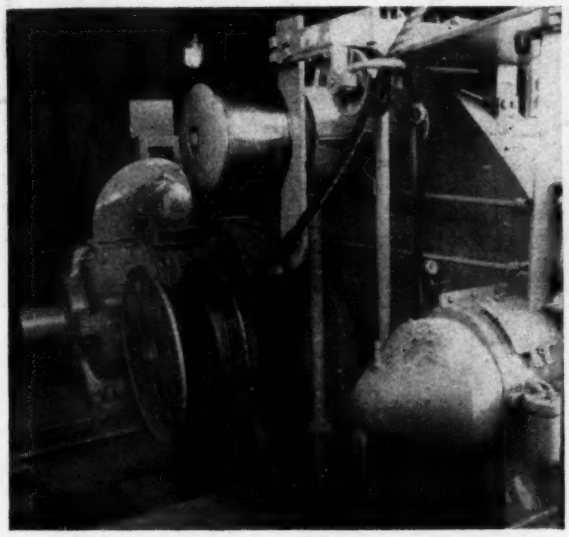


OPERATING IDEAS

Reel For Slack End of Catline

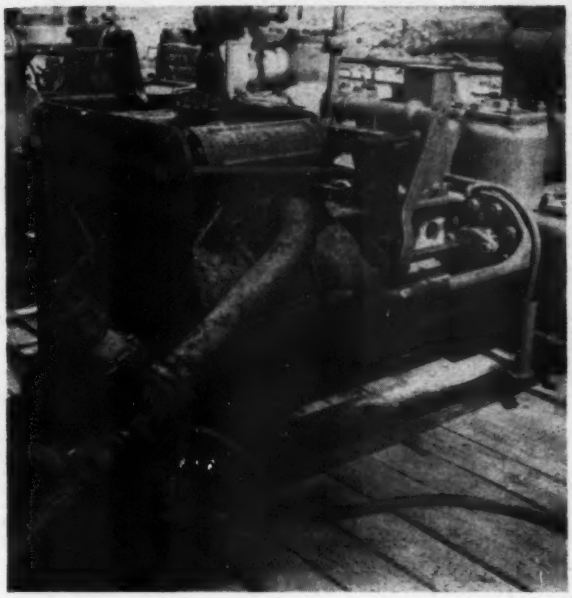
ORDINARILY, the slack end of the catline when not in use is dropped or coiled on the derrick floor where it not only often is in the way and can be tripped over but also is subject to damage from oil or grease in which it might lie. A simple means of avoiding this is to provide a free-wheeling reel on which the line can be spooled as shown in the accompanying picture. There the line is

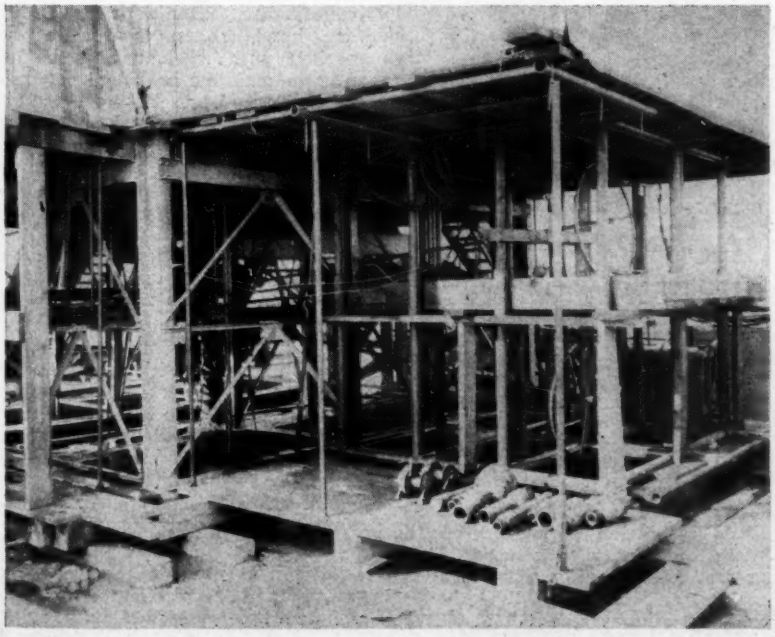


kept off the floor out of the way but also is handy for immediate use without untangling, and also a more orderly appearance is presented. For rig moves the entire line is spooled on the reel, which is an easily transportable unit.

Protective Back For Steam-Cylinder Heads

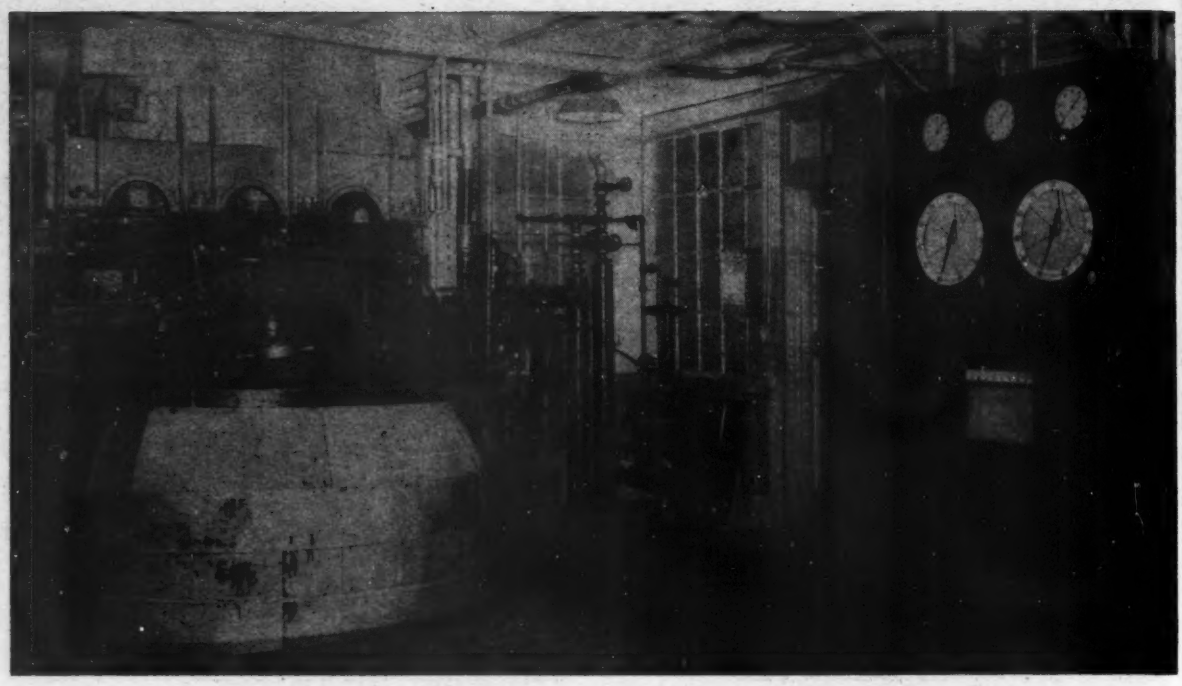
ON any steam mud pump or engine there always is a chance of blowing the head from a steam cylinder. In such an event should a stripped nut or piece of metal strike someone working behind the pump, death or serious injury might result. As protection against such an accident, the steam end of the pump shown in the accompanying picture is provided with a heavy steel plate back covering the heads of the cylinders. The heavy U-shaped rod extending around the front of the cylinders and bolted through the plate on each side holds the back securely in place and is strong enough to withstand the force of a bursting head. The back is hinged at the bottom to the engine skid frame so that it can be lowered easily to permit ready access to the head bolts for repairs on the engine.





Telescoping Engine Substructure

A TELESCOPING substructure that permits a ready adjustment in height of the engine floor within a range of 8 to 14 ft. has been devised by one of the major drilling contracting companies for use on some of its rigs. It is in two identical units, each 8 ft. wide and 14 ft. long, which, on location, are set side by side to form the complete substructure. Each unit contains two sections, a lower section fabricated from 5-in. drill pipe, and an upper section fabricated from 6-in. drill pipe. Legs of the upper sections are matched to telescope over the 5-in. legs of the lower sections. Matched holes, spaced 6 in. apart, are drilled through all the legs through which bolts are inserted to support the upper sections at desired elevations. Each section of both units is approximately 8 ft., which is the height of each unit when fully telescoped. Allowing a 2-ft. overlapping of legs when extended, this provides a maximum elevation of approximately 14 ft.



High-temperature grease kettle and auxiliary equipment used for strontium grease manufacture at Oleum, Calif.

Strontium Greases

Satisfactory for Severe Service Applications

by K. J. Worth and L. W. McClennan*

THIS article discusses a new class of greases, the characteristics of which make them particularly useful for certain practical applications. These lubricants are designated as complex strontium greases, since strontium soaps are employed in a special manner to thicken lubricating oils.

Although strontium is not a scarce metal† the uses of it or its compounds heretofore have not been on as broad a scale as have been, for example, the compounds of calcium and barium. Consequently, in the earlier research work on strontium greases, it was quite difficult to establish a reliable source of commercial supply of strontium hydrate. Furthermore, cost of strontium compounds at that time was high in comparison with that of most other metal compounds used in grease manufacture. After considerable effort, however, an agreement was reached with a chemical manufacturer to maintain a special commercial stockpile of the hydrate for use in the subject investigation. Through virtue of this same arrangement, it was also ultimately possible to reduce cost of the hydrate by roughly 50 per cent. The hydrate is available as crystalline $Sr(OH)_2 . 8H_2O$. It contains only a small percentage of impurities, chiefly as carbonate and/or calcium and barium compounds.

H. J. WORTH

L. W. McCLENNAN

STRONTIUM hydrate, usually employed in making strontium soap greases, has the chemical formula $Sr(OH)_2 . 8H_2O$. These greases are made in conventional-type steam-jacketed kettles with stirrers, and designed to operate at up to 500° F. The product is being made commercially in 7-10-ton lots. The greases are made from several fats including tallow, lard and sperm oils, peanut oils, etc. Little restriction is needed on the types of mineral oils used. These greases fit a large variety of applications, and are especially suited to use at temperatures of 350°-400° F.

Other compounding materials employed include the usual mineral oils and soap stocks, which can be varied widely. The conventional modifiers or additives can also be readily incorporated to improve the greases in respect to their resistance toward oxidation in storage and their protection of bearing surfaces against wear, seizure, and/or corrosion from moisture.

Equipment used in preparing the greases is of the conventional steam-jacketed type, provided with agita-

*Research department, Union Oil Co. of California. Slightly abridged from a paper presented at the fourteenth annual convention of the National Lubricating Grease Institute.

†Lithium and Strontium, New Tools for the Petroleum Industry, by W. F. Luckenbach, Jr., National Lubricating Grease Institute convention, November 1943.

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Some Potential Uses

1. For fortification of spent oleum, making possible a ready supply of any strength oleum.
2. In benzenoid sulfonations for elimination of mixed sulfonates: meta- only or ortho- and para- derivatives only are formed.
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4. For direct sulfonation of aliphatics.
5. For sulfonations in the presence of a solvent, thus eliminating the removal of H_2SO_4 necessary when oleum is the agent.
6. For formation of addition compounds with amines, valuable in organic synthesis.

Sulfuric Anhydride exists in three chemically equivalent physical modifications as indicated by data below. General Chemical's stabilized product is almost entirely Gamma-Form and its partially stabilized product is largely Beta-Form.

PROPERTY	GAMMA-FORM	BETA-FORM	ALPHA-FORM
Description	Ice-Like	Asbestos-Like	Asbestos-Like
Equilibrium			
Melting Point (°C):	16.8	32.5	62.3
Density (20°C)	1.9255	—	—
Sp. Ht. (cals/gm) (20°C)	0.77	—	—
Ht. of Fusion (cals/mol)	1,800	2,900	4,200
Ht. of Sublimation (cals/mol)	11,900	13,000	16,300
Ht. of Dilution (cals/mol)	40,340	—	—
Vapor Pressure (mm.)			
0°C	45	32	5.8
25	433	344	73
50	950	950	650
75	3,000	3,000	3,000

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tors and auxiliary equipment, and powered with a heavy-duty motor, preferably of a variable speed type. The equipment should be designed to operate at temperatures as high as approximately 500° F.

Several types of commercial strontium greases have been marketed to date for a number of special industrial purposes and such greases are now being regularly manufactured in 5-7-ton lots in plant equipment. It is clear, therefore, that strontium base greases can now be considered as fully developed commercial products.

Preparation of Complex Strontium Greases

Manufacture of the strontium greases is carried out in a reasonably straightforward manner, once the different variables are understood and suitable equipment is available. Although certain types can be prepared either by a batch or a continuous process, to date commercial production has been carried out upon a batch basis only. The authors regret that at this time full details of compounding procedures cannot be presented, but such information will be disclosed in patents covering the subject greases, when and if granted. It can be stated, however, that one method of preparing the greases involves the reacting of excess hydroxide with a soap mass at elevated temperatures.

Strontium greases have been prepared from a very wide variety of soap stocks comprising such fats as prime tallow, lard oil, sperm oil, peanut oil, etc. In addition, the fatty acids employed have included such materials as tallow fatty acids, oleic acid, stearic acid, myristic acid, ricinoleic acid, acids from oxidized wax, etc.

Type of oil used can be varied virtually without practical restriction. Greases have been prepared with oils as low in viscosity as 55 S.U.S. at 100° F. or as high in viscosity as 200 S.U.S. at 210° F. Undoubtedly these viscosities could be extended if the need for less-viscous or more-viscous oils were indicated. The viscosity index of the oil can be varied over as wide a range as that represented by the available lubricating oils on the market. For example, one commercial strontium grease contains a California solvent-treated oil of 100 S.U.S. at 100° F. and of 20 VI, whereas another commercial strontium grease contains an oil of 150 S.U.S. at 210° F. and of 105 VI. Technical white oils, residual oils of various types, lubricating-oil distillates, lubricating-oil extracts, etc., can be used if so desired.

Water content of the strontium greases is generally of a negligible magnitude, representing that which remains after essential dehydration of the batch, as in the case of many sodium-base greases. In some instances, however, deliberate incorporation of small percentages of water may serve to smooth the texture and to improve clarity of product.

Various additives have been incorporated in strontium greases to impart enhanced oxidation resistance, antiwear characteristics, extreme-pressure characteristics, and rust-inhibiting properties. In this respect the strontium greases are similar to other greases in that the use of the additives in reasonable amounts does not adversely affect their structure.

Properties of Complex Strontium Soap Greases

Strontium greases may be of either the buttery or fibrous types. In the case of the former type, the greases possess an unctuous texture similar to that of the more familiar calcium, sodium, aluminum, barium, and lithium greases. Depending upon formulation, the fibrous greases may exhibit a short or long fiber, as do the sodium and barium greases.

Properties of strontium greases are determined to some extent by the type of oil or liquid vehicle used and by characteristics of the saponifiable materials from which the soap or thickening agent has been made. For example, the temperature susceptibility or the temperature-viscosity relationship will be controlled in some measure by viscosity index of the mineral oil or liquid used. Solvency of the oil for the particular soap used will also be a factor in respect to syneresis, thixotropy, etc. Likewise, the characteristics of the saponifiable material used to prepare the soap will exert some influence upon the stability and the resistance to oxidation of the grease in storage, its stability at elevated temperatures, etc. Therefore a judicious selection of the correct mineral oil, saponifiable material, and other ingredients applies in the same measure for strontium greases as for other conventional greases. In Table 1 are presented test data for a series of representative strontium greases, showing the general properties.

Complex strontium greases are generally prepared as anhydrous products and in this respect they are comparable to sodium, lithium, barium, aluminum, and certain calcium greases. The anhydrous strontium greases are reversible over wide temperature limits; that is to say, they can be heated and cooled continuously in service without any substantial change in grease structure and any marked change in consistency as a consequence thereof. Few greases possess this very desirable property. On the contrary, many greases are not reversible and upon heating to even moderately elevated temperatures, undergo significant changes in physical structure or lose their stabilizing agent. Consequence of such changes is that, in a bearing operating intermittently at atmospheric and/or elevated temperatures, the recooled grease no longer resembles the original grease but may be much harder and exhibit marked syneresis.

Strontium greases resist the emulsifying and disintegrating effects of water, as in the case of the greases prepared from other alkaline earth metals, and they are therefore classed as water-resistant greases. This resistance is exhibited whether the water is at ordinary temperatures or at elevated temperatures with steam present. The greases also appear to offer considerable resistance to the leaching action of such light hydrocarbons as gasoline. The foregoing combination of properties is of value in lubrication of aircraft bearings, where steam and gasoline may be used in washdown operations.

Resistance to oxidation or breakdown of the strontium greases upon exposure to elevated temperatures is another valuable property. This resistance is due in part to the relative stability of the strontium soaps, although a proper selection of oil and soap stock is also important in formulating the high temperature greases. Grease F (see Table 1) is an example of such a formulation.

The relatively superior rust-protective action of strontium greases, without rust inhibitors, has been exploited to advantage in protecting bearing or metal surfaces exposed to moisture

TABLE 1—REPRESENTATIVE STRONTIUM BASE GREASES PREPARED BY VARIOUS COMPOUNDING PROCEDURES FROM VARIOUS SOAP STOCKS AND MINERAL OILS

Composition or test	Grease A	Grease B	Grease C	Grease D	Grease E	Grease F
Composition (by analysis)						
Strontium soap, %*	26.0	26.0	23.0	29.5	21.5	26.5
Free alkali, %	0.1	0.1	None	0.1	None	0.1
Water, %	Trace	None	None	None	None	None
Oxidation inhibitor used	Yes	Yes	Yes	Yes	Yes	Yes
Mineral oil, %	73.0	73.0	76.5	70.2	78.0	73.0
—S.A.E. grade	†	60	10	30	60	70
—V.I.	20	18	92	90	90	105
—Gravity, °A.P.I.	25.8	20.5	30.4	28.9	26.8	26.5
Properties						
A.S.T.M. penetration at 77° F. (Worked sample)	300	320	300	305	230	300
A.S.T.M. dropping pt., °F.	400+	400+	400+	400+	400+	400+
Oxidation resistance‡	1	2	2	0	1	2
Water resistance (% lost)§	<5	0	0	0	0	<5
Copper corrosion§	None	None	None	None	None	None
Salt spray corrosion¶	<5	‖	<5	<5	‖	<5

*Complex strontium soap. †100 S.U.S. at 100° F. ‡Pressure drop in 100 hr. at 210° F. Initial oxygen pressure. 110 psi. Norma-Hoffman bomb. §AN-G-15 method. ¶Similar to method described in specification AXS-1169. (See Table 2.) ‖Samples not tested.

or salt spray (see Table 2). Degree of protection is influenced to some extent by the method of preparation and ingredients used, as might be expected.

Strontium greases can be prepared, through proper formulation and manufacturing procedures, so that the faults of aerating excessively in service or breaking down markedly under mechanical working are eliminated or greatly minimized. Proper formulation of the greases also permits considerable control of their thixotropic properties.

Enhancing the greases in respect to oxidation resistance, antiwear characteristics, and other specific properties has been achieved in essentially the same manner as for the more conventional greases, namely, by the use of additives for the purpose.

Uses of Complex Strontium Greases

The knowledge of the preparation and the properties of a certain type of grease generally suggests the uses to which it can be put and the probable limitations that may be encountered in such uses. This is also true in the case of the complex strontium greases. The following properties in particular are of interest in respect to uses to which these greases have been put to date:

1. Their resistance to the disintegrating effects of water, at ordinary or elevated temperatures; their resistance to the leaching action of hydrocarbons.

2. Their reversible character over wide temperature ranges, due to their anhydrous character and their freedom from gelation.

3. Their superior protective action against moisture or salt spray corrosion.

4. Their relative stability when used at high temperatures.

5. The stability of their grease structure when subjected to mechanical working.

It is clear that the above combination of properties, supplemented by those special properties imparted as a result of the proper selection of the mineral oil and soap stock used, permits wide and effective application of this new class of grease. Although the greases can easily serve as general-purpose lubricants, to date attention has been directed primarily to those uses wherein the greases can definitely demonstrate their superiority over other available greases, or where some novel application can be made.

Some Applications

Among the many interesting applications of the strontium grease at high temperature is the use of Grease F (see Table 1) throughout the plants of two of the major rubber and tire manufacturers. Although the bearing speeds and loads varied over a wide range, the principal complicating factor was the bearing temperature, which ranged from 275° to 325° F. In the case of one plant, use of this grease permitted uninterrupted operation of the drying ovens. The bearings being lubricated were located within the ovens and were therefore subject to a temperature reported as approximately 325° F. and to an at-

TABLE 2—RESULTS OF SALT SPRAY TESTS ON STEEL PANELS COATED WITH VARIOUS GREASES*

Type of grease	Corrosion of steel panel (surface area corroded, %)
Strontium—(Grease A)†	Less than 5
Strontium—(Grease F)†	Less than 5
Calcium‡—N.L.G.I. No. 1	15-20
Calcium‡—N.L.G.I. No. 4	10-15
Lithium§	75-100
Sodium¶	90-100

*Method similar to that described in AXS-1169. Salt spray test for 100 hours at 95° F. No rust inhibitors added to test samples. †See Table 1 and text. ‡Conventional hydrated cup grease. §Lithium grease prepared with lithium stearate and S.A.E. 30 oil. ¶Sodium wheelbearing grease prepared with tallow soap and S.A.E. 40 oil.

Engineered specifically for extra heavy duty applications where the load is *radial*, AMERICAN RADIAL ROLLER BEARINGS function smoothly and dependably under the most exacting service conditions. Specialized construction, flawless materials and precision manufacturing, set them apart as *the most dependable bearings yet designed* for radial loads where strains are greater . . . where toughness, super-strength and smooth, continuous trouble-free performance are absolute requisites.

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mosphere of sulfur and solvent vapors. Previously, occasional bearing failures, attributable to rapid deterioration of other type lubricants used for the purpose, had necessitated unscheduled shutdowns.

At one large smelter, Grease F demonstrated its merit for severe high-temperature lubrication service by continuously lubricating the bearings of a Jacoby conveyor for a period of over more than 40 days. These were Timken tapered bearings operating at 35 r.p.m. and carrying a variable load of 2,000 lb. per bearing under estimated operating condition temperatures of 350°-400° F. No other grease tested by this smelter had provided effective protection for these bearings.

A railroad company experienced occasional but embarrassing and annoying failures of motor-generator bearings on the modern articulated units equipped with fluorescent lighting. In this case, bearing temperatures were high but not excessive, and the precise explanation for failure has not yet been fully diagnosed. However, bearing temperature appears to have been a contributing factor. In any event, the use of Grease F in these bearings extended the life of the bearings so that their maintenance is now considered by the operators to be on a normal basis.

A large food processor has adopted Grease F as a general-purpose lubricant throughout his plant, since it offers protection over such a wide range of temperature, regardless of the presence of moisture. It is felt that the versatility of the lubricant and its low consumption fully justify the initial purchase expense.

Grease F has also been used in many other antifriction bearings, where temperatures in the vicinity of 300° F. constitute a challenge. Under such circumstances this grease has yet to fail in providing satisfactory lubrication. It has been tested by a number of independent laboratories in bearings operating at high speeds for prolonged periods at 300° F. or even higher. In all cases, performance of the grease has been outstanding. It also satisfies the requirements of such government specifications as AN-G-5a and 14-L-3c.

Grease F has been used to lubricate bearing points on aircraft where high temperatures are involved. Such high temperatures are encountered on bearing points in the engine nacelle. The grease has been used in other bearings on aircraft, where bearing temperatures may fall within the operating range of 0-°300° F.

Lubricating Kiln Bearings

Another interesting application of Grease F was found in connection with lubrication of kiln bearings as a substitute for conventional brick grease. Temperature of these particular bearings was estimated to run very high and difficulty had been encountered in lubricating them, except with special brick greases. Incorporation of Grease F with wool yarn served as an effective substitute for brick grease.

The problem of lubricating glass joints on large glass distillation units has frequently presented difficulties through sticking, breakage, etc. The combination of water condensate, hydrocarbons, and heat presents formidable problems. Lubrication of such glass joints under severe temperature conditions was satisfactorily obtained by employing a special strontium grease of high soap content and containing a highly viscous residual oil.

Strontium grease of the type represented by Grease A has been used on bearings operating within the range of —40° to 250° F. and has found extended application as a general-purpose lubricant on aircraft. On a number of trans-Pacific test runs made by a well-known operating air line, the protective action of both Grease A and that described earlier, Grease F, against corrosion of salt spray and moisture was confirmed. Grease A has been used successfully as a general aircraft lubricant by a number of the prominent airframe manufacturers and airline operators.

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QUESTIONS on TECHNOLOGY

by W. L. Nelson

Consulting Engineer

This department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in various phases of plant operation, as well as those connected with the marketing and utilization of petroleum products. Readers are invited to submit their problems to W. L. Nelson, technical editor. Inquiries must be signed, but only the initials will be printed.

Disposal of Refinery Wastes

"How to Detect Contamination of Steam Condensate with Oil" on the Questions on Technology page of December 14 was interesting and informative. Any information on the treatment or disposal of refinery wastes would be greatly appreciated. —B. E. W.

The following is a list of references available to this department regarding the treatment or disposal of refinery wastes:

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5. Willson, C. O., Two Oklahoma Refineries Install Waste Water-Recovery Plants, The Oil and Gas Journal, September 17, 1931, p. 16.

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12. Lovell, R. G., Overcoming Difficulty of Separating Water from "Slop Oil" in Refinery, Pet. Engineer, April 1942, p. 90.

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19. Rook, C. G., Talco Refinery Trade-Waste Treating Purifies Water for Cooling, Pet. Refiner, July 1945, p. 115.

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25. Anon., Filters Are Used to Remove Oil From Boiler Water, Pet. Eng. Dec. 1941, p. 127.

26. Burroughs, L. C., Disposal of Refinery Wastes, Pet. Refiner, July 1946, p. 81.

27. A.P.I., Disposal of Refinery Wastes, Sect. 1, Waste Water Containing Oil, 2nd Ed., 1933, A.P.I. New York.

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Pebble Heater

Where can we get information about the new pebble exchanger for heating oils to high temperatures?—B. R. C.

The question probably refers to the pebble heater of Babcock & Wilcox Co. which has been used primarily for the heating of air, steam, etc., to temperatures of 1,800°-2,300° F. Perhaps it could be used for heating oil or oil vapor but such an application has not come to the attention of this department. In attaining such temperatures as 1,800°-2,300° F. it is necessary to use ceramics materials because no cheap metals are available for such temperatures. In the steel and smelting industries, regenerative checker-brick heaters or stoves have been employed. The checker brick is heated by flue gases and later is used to heat the incoming air or fuel while another stove is being heated by flue gas.

The principle of the pebble heater involves raising the temperature of a constantly moving column of pebbles to a high temperature and then passing the gas to be heated through the interstices of the moving pebble column. The pebbles are made of heat-resistant nonmetallic material.

The heater consists of two cylindrical chambers, one above the other, connected by a throat section of reduced diameter. By filling the chamber and throat with refractory pebbles, a permeable bed is formed through which gases can be made to travel. At the outlet of the bottom chamber, there is a mechanical feeder which controls the rate at which the pebbles are conveyed continuously back to the top of the upper chamber. The pebbles in the heater move downward at a constant rate during the entire operation.

Fuel and air are burned in a combustion chamber, and the products of combustion flow through hot gas inlets into the top chamber and then upward through the bed of downwardly moving pellets and out the stack at the top. The heated pebbles pass through the throat section of the lower chamber.

The gas to be heated is introduced at a point near the bottom of the lower chamber. The gases pass through a screen to provide uniform distribution, then travel upwardly through the heated pebble bed and leave at a point near the top of the lower chamber.

In operation, the pressures in the tube chambers are usually maintained at the same value, so that there is no gas flow through the throat section. Zero gas flow, or a flow in either direction, can be maintained by automatic control of a damper in the exit stack of the upper chamber.

Reaction Chamber Volume

We have two reaction chambers in our cracking plant and we are figuring on removing the smaller one. The large chamber is 44 ft. long and 5 ft. 3 in. diameter and the smaller is 41 ft. long and 3 ft. 11 in. The capacity is 2,000 bbl. per day. Do we need both the chambers?—F. R. C.

According to Mithoff and Schimansky (Reaction Chambers on Thermal Cracking Units, twenty-second annual A.P.I. meeting, San Francisco, November 1941), reaction volume, up to 0.3 to 0.4 cu. ft. of reaction chamber volume per daily barrel, is the cheapest way to get cracking-plant capacity. Past such volumes the situation is not clear, although it appears certain that extremely large volumes are not much better than the volumes recommended above. In computing the reaction volume, half of the volume of the flash chamber as well as that of the reaction chambers is computed. In general it seems that the plant in question has more reaction volume than necessary, and that almost any good reason might justify the removal of one of the chambers.

More Gasoline— Less Coke—

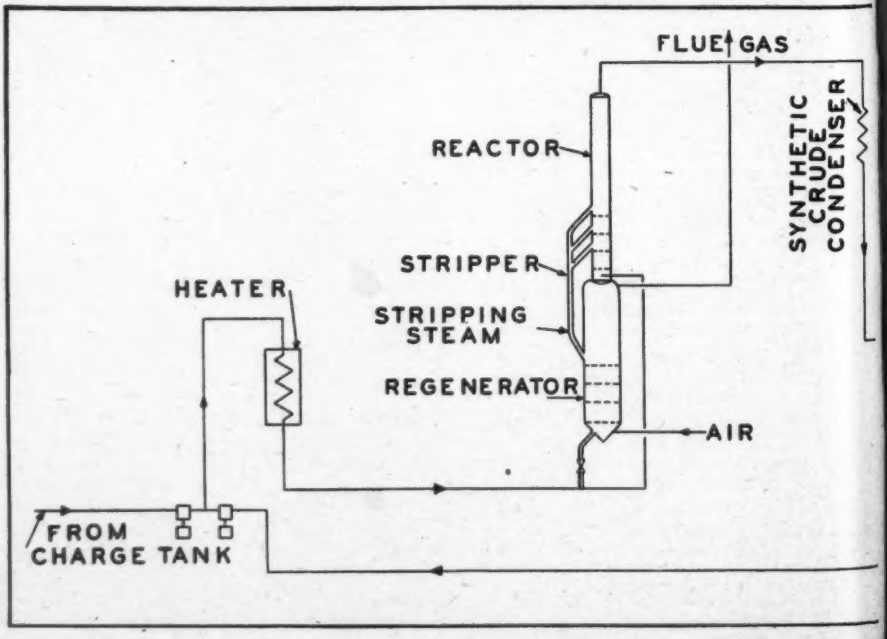
From New Cat-Cracker Design

View of newest U.O.P. fluid catalytic cracking pilot plant

ORIGINAL design features developed by engineers of Universal Oil Products Co., and proved out in a new type fluid catalytic-cracking pilot plant, foreshadow substantial advantages to refiners by making the cracking reaction more efficient.

Experimental results indicate that a commercial unit embodying these improvements will produce considerably higher yields of gasoline than are obtained in catalytic-cracking units of conventional design and will reduce substantially the amount of coke which must be burned. Any reduction in the quantity of coke effects important operating economies.

The higher yield of gasoline is accomplished mainly by two features, namely, better utilization of space in reactor and regenerator, and more efficient stripping of adsorbed light fractions from the spent catalyst. Better utilization of space is achieved by the installation of distribution grids of original design in the reactor and regenerator. This design feature minimizes overcracking and particularly the cracking of catalytic gasoline fractions to gas and coke. The improved stripping is accomplished



by the use of an external stripper which allows intimate and efficient contact between the stripping medium, which is steam, and the spent catalyst.

In the new design, coke formation is lessened by two major factors:

1. The more efficient stripping of the spent catalyst which recovers gasoline fractions that otherwise would be lost, also removes much of the heavy coke-forming hydrocarbons before the spent catalyst goes to the regenerator.

2. Countercurrent flow of spent catalyst and hot flue gas in the regenerator permits the use of the top zone of the regenerator dense phase catalyst bed as a "distillation" section. In this section, flue gas at temperatures higher than those prevailing in the stripper, and practically devoid of oxygen, meets the downcoming spent catalyst, serving to distill off much of the heavy hydrocarbons, thus further reducing the formation of coke.

Considerable economy in construction results from reduction in size of reactor and regenerator, which is made possible by more efficient space utilization.

In designing the latest U.O.P. pilot plant, engineers had at hand extensive data which had been obtained through long study of catalyst circulation in glass models and operation of previous fluid catalyst pilot plants, as well as the practical experience gained in the design and operation during the war of more than a dozen conventional type commercial fluid catalytic-cracking units.

The new pilot plant normally runs 3-4 bbl. of fresh feed and recycle per day. Its principal parts are:

An electrically fired radiant tubular heater, really a miniature U.O.P. Equiflux heater.

Instrument panel of U.O.P. new catalytic cracking pilot plant

A reactor-regenerator assembly approximately 23 ft. high and 10 in. i.d., in which the reactor is at the top of the column and the regenerator is at the bottom.

A synthetic crude condenser which cools and condenses the effluent from the reactor.

A synthetic crude receiver provided to separate uncondensed gases from the liquid.

A compressor which takes uncondensed gases from the receiver and passes them to a high-pressure absorber for recovery of butane-butylene fractions which otherwise would be lost.

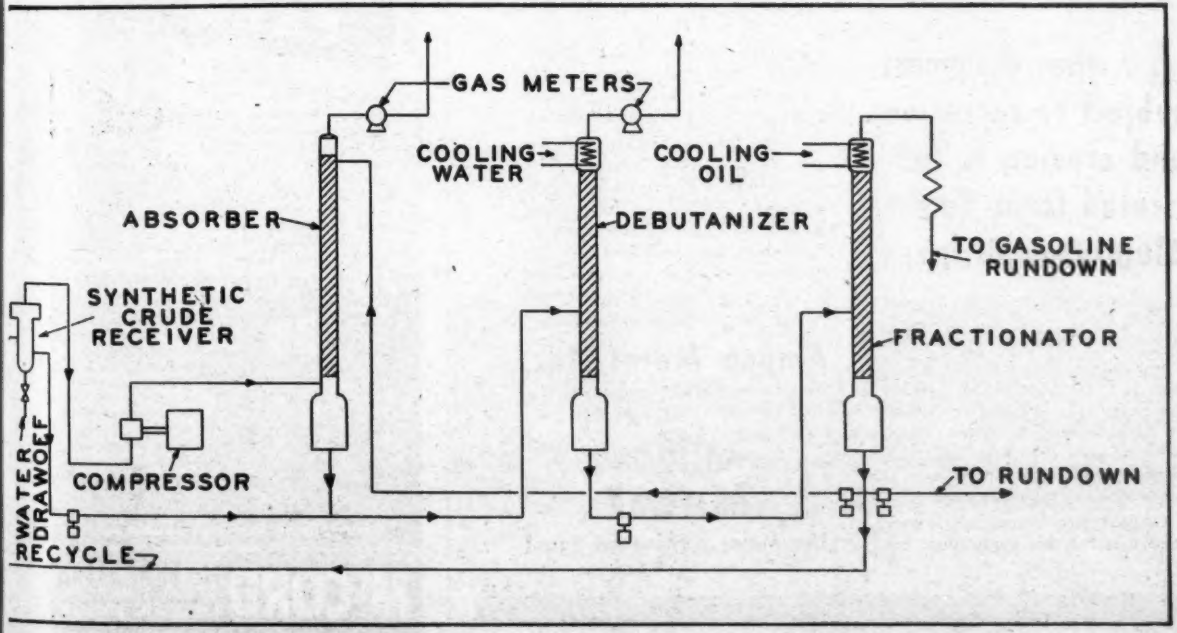
A debutanizer for removing the dissolved gas from both the synthetic crude and the rich absorption oil.

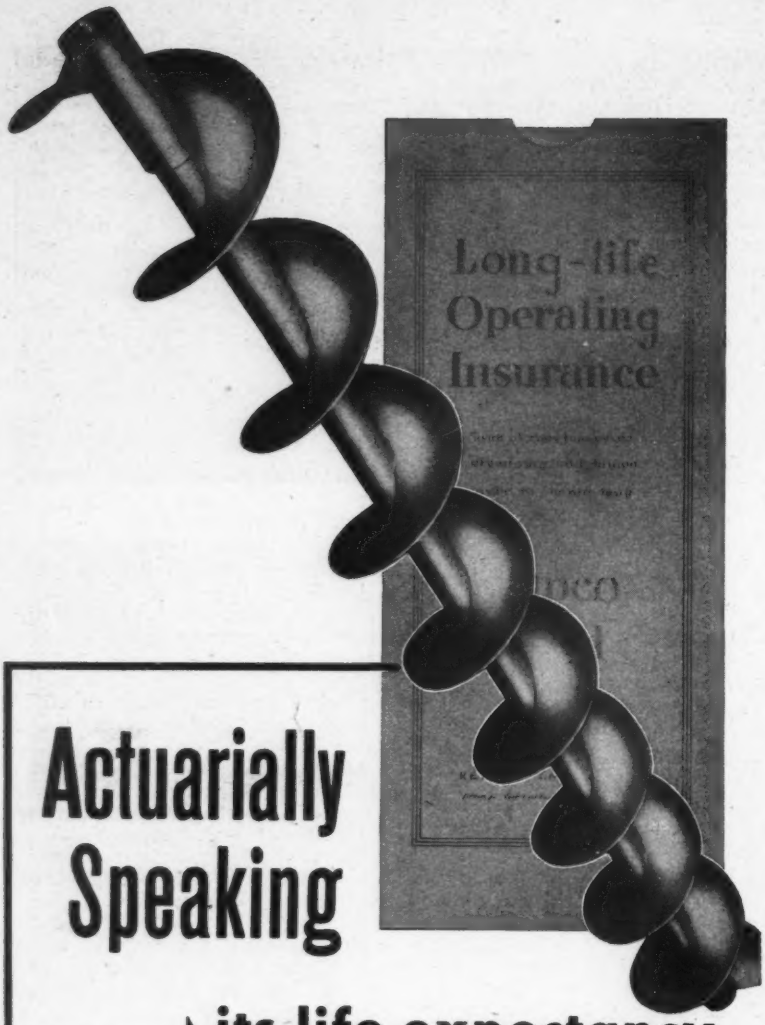
A fractionator which processes the debutanizer bottoms stream for separation of catalytic gasoline from unconverted gas oil. A portion of the gas oil is used as absorption oil in the absorber. The rest is recycled or removed as a net product.

Control instruments required for precise operation of the unit are mounted on an instrument panel which is necessarily at least as complete as that of a large commercial unit because of the variety of experimental data required.

This new plant has been operated on normal gas oils, and also on heavy gas oils with end points up to 1,000° F., and has confirmed the increased gasoline yield and reduced coke expected by the design engineers.

Flow diagram of the new pilot plant





Actuarially Speaking

its life expectancy is much greater

. . . when equipment subject to corrosion and erosion is fabricated from Ampco Aluminum Bronzes

This 11-foot, 6-inch conveyor screw runs in a 6% solution of sulphuric acid heated to 210° F. It is fabricated from Ampco 15 sheet and Ampco 15 extruded stock. Welding was done with Ampco-Trode 10 aluminum bronze electrodes, which have the same corrosion- and wear-resistance, and the same physical properties as the parent metal.

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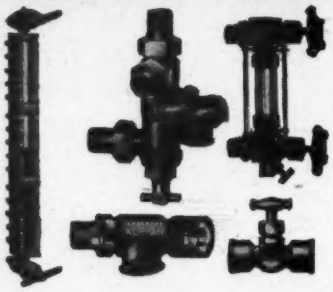

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Control of Per Interval Producing Rates

(Continued from page 68)

when $K_a/K_b = 1/2$, $W_b = -0.4N$ so that the (b) interval would require only 60 per cent of the total wells.

Evidently, control of producing rates by operating at uniform bottom-hole pressure and drilling additional wells is not likely to be practical in many instances. The solution is to isolate production and lower the bottom-hole operating pressure whenever the over-all operating expense at the lower pressure is less than the investment in additional wells plus the expense of operating the additional wells. But if an interval is already saturated with wells, the drilling of additional wells will not increase well capacity for the interval. The only alternative is to lower the bottom-hole operating pressure when the reservoir pressure cannot be changed.

Unequal Reservoir Pressures

Suppose the (a) and (b) intervals are not interconnected downdip from the water contact. Under this condition, the reservoir pressures for the two intervals are not likely to be uniform. When the ratio of drawdown is included, we have:

$$W_b = N\left[\frac{Q_b h_a K_a (P - p)_a}{Q_a h_b K_b (P - p)_a} - 1\right] \quad (11)$$

Other things being fixed, the number of additional wells required by an interval such as (b) is given by:

$$W_b = N\left(\frac{C\,\Delta P_a}{\Delta P_b} - 1\right) \quad (12)$$

where C is some constant. The ratio of pressure drawdown may be controlled through adjustment of either reservoir or bottom-hole pressures.

Summing up, per-interval producing rates for no injection wells should be controlled by that combination of (1) number of wells, (2) bottom-hole pressure and (3) reservoir pressure for which the cost per barrel of reserve is least. But if an interval is already saturated with wells, the control is through drawdown only. Under some conditions, over-all costs are minimized by reducing the rate of production from the interval having the higher productivity.

Negligible Water Encroachment

Suppose the per-interval rate of water encroachment is negligible. Intervals (a) and (b) are produced entirely by injected water. If the impermeable break extends far enough downdip below the water contact, injected water is not likely to spill around the break either from (a) to (b) or vice versa. Under this condition, per-interval producing rates may be controlled by the rate of water injection. The assumption is that the intervals are not interconnected via injection wells. The intervals may be interconnected via producing wells. The producing ratio is equal to the injection ratio.

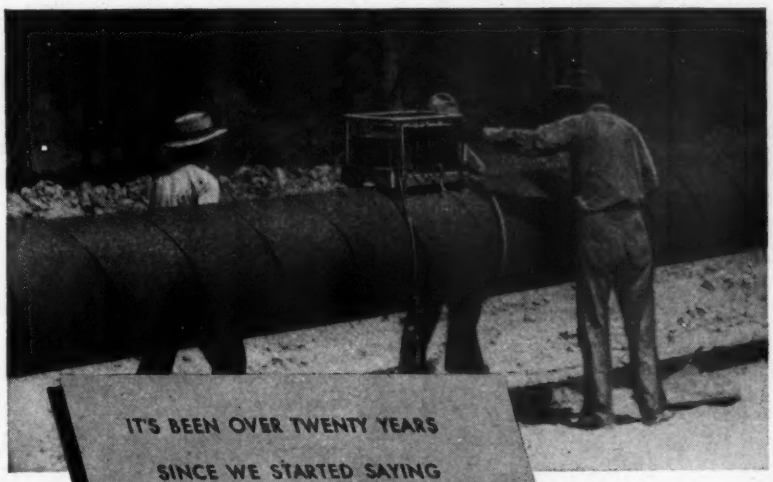
On the other hand, if the downdip extent of an impermeable break is limited, we cannot rely on injection rates to control producing rates. Interconnection via injection wells places the control of producing rates on producing wells.

Partial encroachment of edge water also places the control of producing rates on producing wells. As most reservoirs have some water encroachment, it appears that the control of producing rates depends primarily on isolating production by intervals.

Suppose intervals (a) and (b) are interconnected via producing wells but not by way of injection wells. The required ratio of injection wells, aside from encroachment, is defined approximately by:

$$\frac{N_a}{N_b} = \frac{Q_a [hK (P_w - P)]_b}{Q_b [hK (P_w - P)]_a} \quad (13)$$

where Q_a/Q_b is the required ratio of oil production. The h's refer to feet of completion for injection wells. The K's are the permeability of reservoir-injection-well systems. P_w is the bottom-hole injection pressure and P, the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reservoir pressure. The distance from injection wells to the first row of producing wells are approximately the same for both intervals.

The Optima for Two Intervals

Per-interval optima corrected for the influence of two intervals on each other are the optima for two intervals. The least distance between producing wells commensurate with depth gives the optimum spacing. The optimum locations for producing wells are on the crest. If wells are completed in both intervals, location of wells is no problem.

Suppose, however, that per-interval pay thickness is large enough to support individual completions. The per-interval optimum locations now depend on productive life. When the life is approximately the same for both intervals, alternate crestal locations would be suggested. But when the life of one interval is significantly higher than that of another, all of the structurally highest wells would be completed in the interval having the shorter life. Ultimately, these wells would be recompleted in the interval having the comparatively longer life. The assumption is that the per-interval structurally high areas overlap. If not, the optimum locations are on the areas underlain by the crest of each interval. Crestal locations should displace overlapping locations which are not crestal locations.

The optimum locations for injection wells are in the vicinity of water contacts. When control of producing rates through injection rates is not required, the wells may be open to both intervals where water contacts overlap. If not, the structurally lower oil-water interface should advance up to the position of the structurally higher interface before the structurally higher injection wells are opened to both intervals. But the structurally lower injection wells may be opened to both pays if there be no intervening stratigraphic and structural barriers.

Given sufficient difference between the optimum rate of production and the per-interval MER, the optimum rate of production for two intervals is equal to the sum of the MER's. Economic balances should be run to optimize the per-interval reservoir pressure and the ratio of the reservoir pressures for the two intervals produced at MER. The ratio of per-interval reservoir pressures having the highest earnings for the reserve in both intervals is the optimum reservoir pressure.

U.S. Report Lists Total of 214,100 Filling Stations

A total of 214,100 filling stations were in operation throughout the United States in June 1946, according to a report of the Office of Business Economics of the Department of Commerce.

The total represents a 25 per cent gain over the 171,300 stations in operation in December 1943, as compared to a 23 per cent increase in the number of retail businesses of all kinds during the same period. For all kinds of business, new proprietors were starting in 1946 at a rate about double that of 1940 and 1941, while the rate of business discontinuances was about half that of the two prewar years, the report said.

A.A.P.G. Train Scheduled

DALLAS. — North Texas members of the American Association of Petroleum Geologists and others attending the national convention in Los Angeles March 24-28 may make train reservations from Dallas or Fort Worth, according to Santa Fe railroad officials. Special cars will leave Dallas at 9:30 p.m. and Fort Worth at 11:15 p.m. March 20. The Santa Fe Special leaves Houston at 9:15 p.m. March 20 and will pick up the North Texas groups at Brownwood, Tex. Scheduled arrival in Los Angeles is 10 a.m. March 23.

The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Sulfuric Acid Solutions

Specific Gravity from 32° to 212° F.

(Also see Notebook No. 74, December 29, 1945)

Weight per cent H_2SO_4	Baumé	Temperature, °C. or °F. 32° F. 0° C.	50° F. 10° C.	59° F. 15° C.	68° F. 20° C.	77° F. 25° C.	86° F. 30° C.	104° F. 40° C.	122° F. 50° C.	140° F. 60° C.	176° F. 80° C.	212° F. 100° C.
2	1.7	1.0147	1.0138	1.0129	1.0118	1.0104	1.0087	1.0050	1.0006	0.9956	0.9839	0.9705
4	3.5	1.0291	1.0275	1.0264	1.0250	1.0234	1.0216	1.0176	1.0129	1.0078	0.9961	0.9827
6	5.4	1.0437	1.0414	1.0400	1.0385	1.0367	1.0347	1.0305	1.0256	1.0203	1.0084	0.9950
8	7.2	1.0585	1.0556	1.0539	1.0522	1.0502	1.0481	1.0437	1.0388	1.0330	1.0209	1.0076
10	9.0	1.0735	1.0700	1.0681	1.0661	1.0640	1.0617	1.0570	1.0517	1.0460	1.0338	1.0204
12	10.8	1.0886	1.0846	1.0825	1.0802	1.0780	1.0756	1.0705	1.0651	1.0593	1.0469	1.0335
14	12.5	1.1039	1.0994	1.0971	1.0947	1.0922	1.0897	1.0844	1.0788	1.0729	1.0603	1.0469
16	14.3	1.1194	1.1145	1.1120	1.1094	1.1067	1.1040	1.0985	1.0927	1.0868	1.0740	1.0605
18	16.0	1.1351	1.1298	1.1271	1.1243	1.1215	1.1187	1.1129	1.1070	1.1009	1.0879	1.0744
20	17.7	1.1510	1.1453	1.1424	1.1394	1.1365	1.1335	1.1275	1.1215	1.1153	1.1021	1.0885
22	19.4	1.1670	1.1609	1.1579	1.1548	1.1517	1.1486	1.1424	1.1362	1.1299	1.1166	1.1029
24	21.1	1.1832	1.1768	1.1736	1.1704	1.1672	1.1640	1.1576	1.1512	1.1448	1.1313	1.1176
26	22.8	1.1996	1.1929	1.1896	1.1862	1.1829	1.1796	1.1730	1.1665	1.1599	1.1463	1.1325
28	24.4	1.2160	1.2091	1.2057	1.2023	1.1989	1.1955	1.1887	1.1820	1.1753	1.1616	1.1476
30	26.0	1.2326	1.2255	1.2220	1.2185	1.2150	1.2115	1.2046	1.1977	1.1909	1.1771	1.1630
32	27.6	1.2493	1.2421	1.2385	1.2349	1.2314	1.2278	1.2207	1.2137	1.2068	1.1928	1.1787
34	29.1	1.2661	1.2588	1.2552	1.2515	1.2479	1.2443	1.2371	1.2300	1.2229	1.2088	1.1946
36	30.7	1.2831	1.2757	1.2720	1.2684	1.2647	1.2610	1.2538	1.2466	1.2394	1.2251	1.2109
38	32.2	1.3004	1.2929	1.2891	1.2855	1.2818	1.2780	1.2707	1.2635	1.2561	1.2418	1.2276
40	33.7	1.3179	1.3103	1.3065	1.3028	1.2991	1.2953	1.2880	1.2806	1.2732	1.2589	1.2446
42	35.2	1.3357	1.3280	1.3242	1.3205	1.3167	1.3129	1.3055	1.2981	1.2907	1.2762	1.2619
44	36.7	1.3538	1.3461	1.3423	1.3384	1.3346	1.3308	1.3234	1.3160	1.3086	1.2939	1.2796
46	38.1	1.3724	1.3646	1.3608	1.3569	1.3530	1.3492	1.3417	1.3343	1.3269	1.3120	1.2976
48	39.6	1.3915	1.3835	1.3797	1.3758	1.3719	1.3680	1.3604	1.3528	1.3455	1.3305	1.3159
50	41.1	1.4110	1.4029	1.3990	1.3951	1.3911	1.3872	1.3795	1.3719	1.3644	1.3494	1.3348
52	42.5	1.4310	1.4228	1.4188	1.4148	1.4109	1.4069	1.3991	1.3914	1.3837	1.3687	1.3540
54	44.0	1.4515	1.4431	1.4391	1.4350	1.4310	1.4270	1.4191	1.4113	1.4036	1.3884	1.3735
56	45.4	1.4724	1.4640	1.4598	1.4557	1.4516	1.4475	1.4396	1.4317	1.4239	1.4085	1.3934
58	46.8	1.4937	1.4852	1.4809	1.4768	1.4726	1.4685	1.4604	1.4524	1.4446	1.4290	1.4137
60	48.2	1.5154	1.5067	1.5024	1.4983	1.4940	1.4898	1.4816	1.4735	1.4656	1.4497	1.4344
62	49.6	1.5375	1.5287	1.5243	1.5200	1.5157	1.5115	1.5031	1.4950	1.4869	1.4708	1.4554
64	51.0	1.5600	1.5510	1.5465	1.5421	1.5378	1.5335	1.5250	1.5167	1.5086	1.4923	1.4768
66	52.3	1.5828	1.5736	1.5691	1.5646	1.5602	1.5558	1.5472	1.5388	1.5305	1.5140	1.4981
68	53.7	1.6059	1.5965	1.5920	1.5874	1.5829	1.5785	1.5697	1.5611	1.5528	1.5359	1.5198
70	55.0	1.6293	1.6198	1.6151	1.6105	1.6059	1.6014	1.5925	1.5838	1.5753	1.5582	1.5417
72	56.3	1.6529	1.6433	1.6385	1.6338	1.6292	1.6246	1.6155	1.6067	1.5981	1.5806	1.5637
74	57.5	1.6768	1.6670	1.6622	1.6574	1.6526	1.6480	1.6387	1.6297	1.6209	1.6031	1.5857
76	58.7	1.7008	1.6908	1.6858	1.6810	1.6761	1.6713	1.6619	1.6526	1.6435	1.6252	1.6074
78	59.9	1.7247	1.7144	1.7093	1.7043	1.6994	1.6944	1.6847	1.6751	1.6657	1.6469	1.6286
80	61.1	1.7482	1.7376	1.7323	1.7272	1.7221	1.7170	1.7069	1.6971	1.6873	1.6680	1.6493
82	62.1	1.7709	1.7599	1.7544	1.7491	1.7437	1.7385	1.7281	1.7180	1.7080	1.6882	1.6692
84	63.0	1.7916	1.7804	1.7748	1.7693	1.7639	1.7585	1.7479	1.7375	1.7274	1.7072	1.6878
86	63.9	1.8095	1.7983	1.7927	1.7872	1.7818	1.7763	1.7657	1.7552	1.7449	1.7245	1.7050
88	64.5	1.8243	1.8132	1.8077	1.8022	1.7968	1.7914	1.7809	1.7705	1.7602	1.7397	1.7202
90	65.1	1.8361	1.8252	1.8198	1.8144	1.8091	1.8038	1.7933	1.7829	1.7729	1.7525	1.7331
92	65.5	1.8453	1.8346	1.8293	1.8240	1.8188	1.8136	1.8033	1.7932	1.7832	1.7633	1.7439
94	65.8	1.8520	1.8415	1.8363	1.8312	1.8260	1.8210	1.8109	1.8011	1.7914	.....	.....
96	66.0	1.8560	1.8457	1.8406	1.8355	1.8305	1.8255	1.8157	1.8060	1.7965	.....	.....
98	66.0	1.8567	1.8463	1.8411	1.8361	1.8310	1.8261	1.8163	1.8068	1.7976	.....	.....
100	65.8	1.8517	1.8409	1.8357	1.8305	1.8255	1.8205	1.8107	1.8013	1.7922	.....	.....

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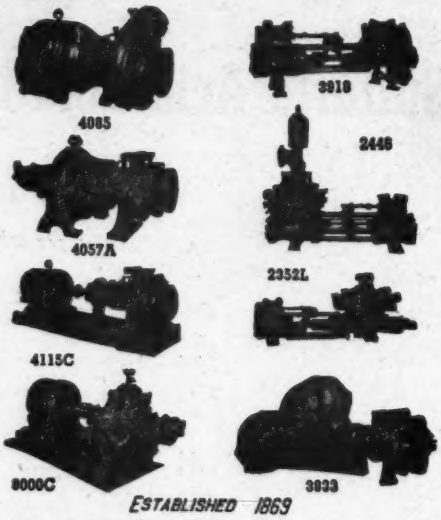

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MODERN Rotary DRILLING

A.P.I. Substructures

A PORTABLE steel substructure for drilling derricks has been in general use for a number of years. The A.P.I. specifications provide two arrangements, known as Types "A" and "B," and shown in Figs. 6 and 7 respectively. The figures are based on data presented in the twelfth edition of A.P.I. Standards No. 4, published in July 1944.

The A.P.I. substructure consists of two parts, the derrick supports and the rotary supports. The combined capacity of the four corners is 950,000 lb. minimum for 26 and 30-ft. base and 700,000 lb. minimum for 24-ft.-base substructures. Depending on the size of the base the capacity of rotary supports ranges from 450,000 to 300,000 lb. and of pipe setback from 200,000 to 150,000 lb. The standard height, from bottom of the corner post base to the substructure framing sills, is 7 ft. 3 in.

Present Needs

Some of the features of the present standard A.P.I. substructure do not meet the demands of modern deep-well drilling. This is particularly true in regard to the height of the standard substructure and arrangement of its rotary supports.

With the trend away from the use of cellars and with the increasing height of the well head equipment the standard height of 7 ft. 3 in. is, in many cases, not sufficient. Some of multiple blowout-preventer assemblies require space in excess of 9 ft.

Separate rotary supports reduce the working room around the heavy well-head equipment. Also, in case of locations which require piling as a foundation, separate clusters of piling must be made available for the support columns. This increases considerably the cost of the foundation and makes difficult drilling of multiple wells from one location, a practice now quite common in cases of difficult locations.

The problem of support for the increasingly large size of draw works is becoming quite difficult. In some arrangements portion of the draw works rests on the derrick substructure while the remainder is supported by a separate or engine substructure. The disadvantage of this solution is the possibility of uneven settling of the two supports.

Proposals for changes in the present specifications are under consideration of the A.P.I. standardization committees. For instance, in regard to the draw-works support, it has been suggested that the derrick substructure be notched out on the draw-works side and that the draw works be set in this cutout portion, resting on its own independent auxiliary support. While this and other suggestions are considered the manufacturers are proceeding with building of substructures which offer solutions for some of the problems mentioned above. Two of these solutions will be illustrated in the following installment.

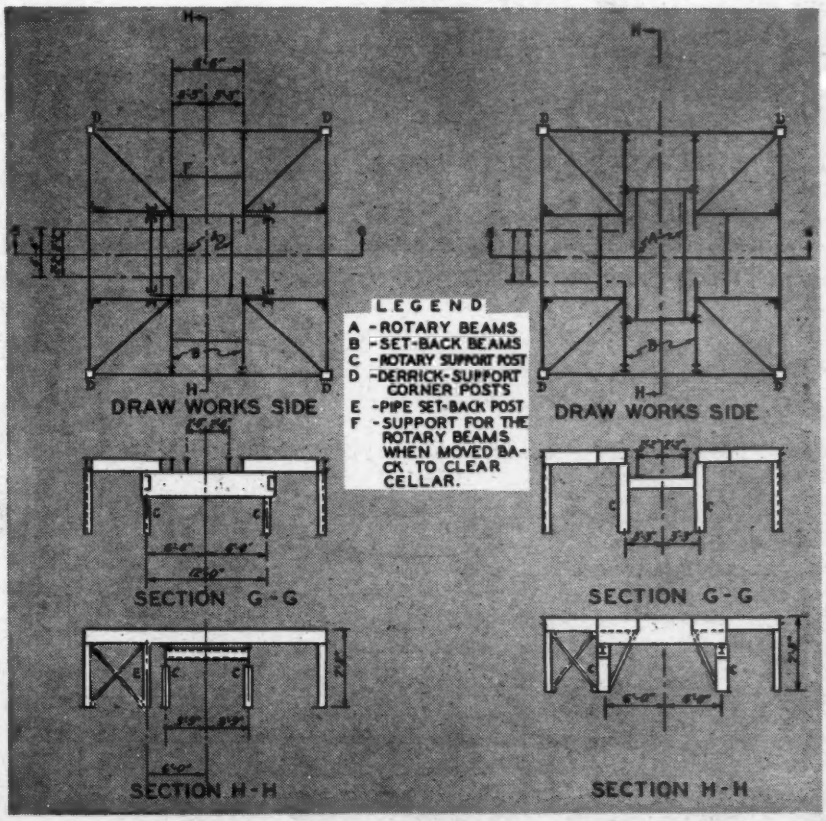

Fig. 6—(Left) Type "A" A.P.I. substructure. Fig. 7—(Right) Type "B" A.P.I. substructure

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ENGINEERING *fundamentals*

Computations of Plunger Travel

PART 1

A NUMBER of engineers have proposed formulas for the computation of rod stretch and plunger motion based on the fundamental relations which have been discussed in preceding articles. In each of these it has been necessary to make some assumptions, although the latter have not all been made by the same authors. In practice it is highly desirable to substitute actual measurements for theoretical proposals, and for that purpose the use of the dynamometer at the well head and the dynagraph at the working barrel are invaluable. Nevertheless, it is a valuable procedure to ascertain as far as possible what the theoretical considerations are, since knowledge of these will usually cause the engineer to be alert in the search for other possible factors that may help in the practical solution of pumping problems.

The various formulas proposed by different engineers for the solution of these problems are more or less similar. They are presented with proper credit to each, in so far as the writer is able to ascertain.

Marsh-Coberly: H. N. Marsh proposed the following formula for computation of loss of plunger stroke,[1] a formula which C. J. Coberly modified in a discussion thereof.

$$e = C_o \left(\frac{L}{1{,}000}\right)^2 \qquad (1)$$

where

e is stretch of the sucker rods.
C_o is the coefficient of stretch.
L is the length of the sucker-rod string.

The coefficient of stretch, proposed by Marsh, is merely a device for expressing the elastic properties of the steel as a factor which is identical with P/EAL, (see Engineering Fundamentals No. 253, Equation 1, October 21, 1946), but is computed as follows:

$$C_o = \left(\frac{12 \times 1{,}000^2 \times A_p \times P}{30 \times 10^6}\right) \times (1/A_r + 1/A_t) \qquad (2)$$

where

A = area of the plunger, sq. in.
P = Pressure of the liquid, psi. per ft. of depth.
A_r = cross section a/area of rods.
A_t = cross section a/area of steel in the tubing.

The plunger stroke then becomes:

$$S_p = S_r - e \qquad (3)$$

where

S_p = the plunger stroke, in.
S_r = the polished-rod stroke, in.

Coberly's modification of Equation 3 takes into consideration the net overtravel of the plunger that results from acceleration of the latter at the top and bottom of the stroke, and may be expressed:

$$S_p = S_r - e + t_o \qquad (4)$$

where t_o represents the net overtravel.

The factor t_o may be computed as follows:

$$t_o = \frac{1.93 \times (ZN)^2}{10^5} \times S_r \qquad (5)$$

where

Z = the length of the rods/1,000.
N = s.p.m.

If Equations 1, 2, and 5 be substituted in Equation 4 the final equation becomes;

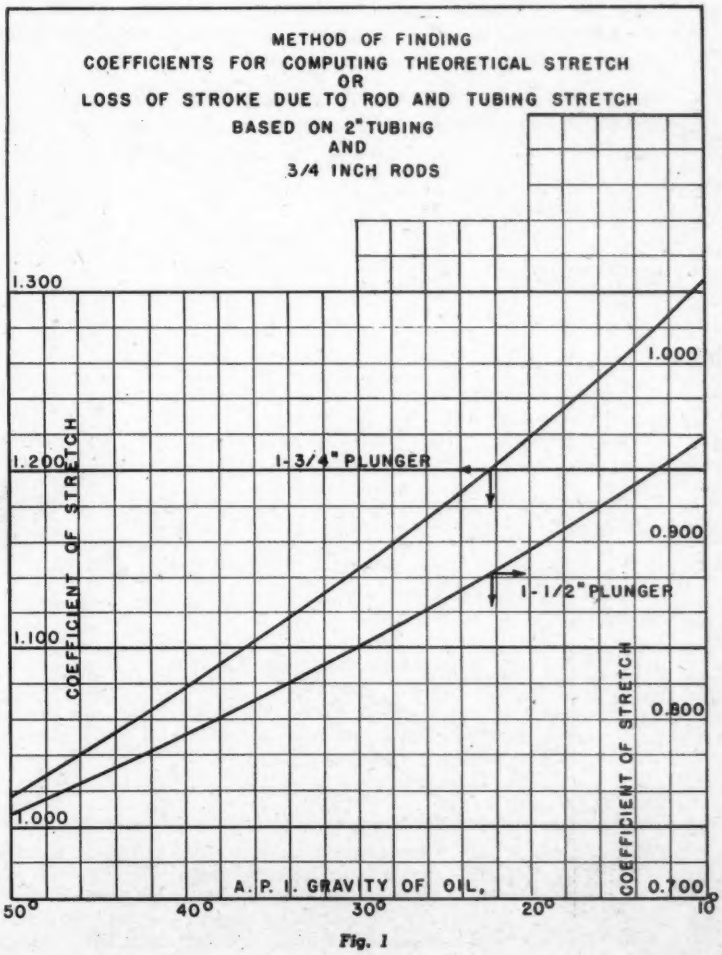


Fig. 1

Series prepared by Dr. E. A. Stephenson, head of petroleum engineering school, University of Kansas

$$S_p = S_r - \frac{12 \times 1{,}000^2 \times A_p \times P}{30 \times 10^6} \times \left(\frac{1}{A_r} + \frac{1}{A_t}\right) + \frac{1.93 \times (ZN)^2}{10^5} \times S_r \quad (6)$$

Problem:

Compute the net stroke of the plunger for the following well data:

Depth of well = 5,465 ft.
Length of rods = 4,050 ft. of ¾-in. rods + 1,400 ft. of ⅞-in. rods.
Tubing = 5,200 ft. of 3-in. + 265 ft. of 2.5 in.
Plunger = 2 in. x 1¾ in.
Wt. of rods per ft. = 1.63 lb. for ¾ in.
Wt. of rods per ft. = 2.26 lb. for ⅞ in.
Gravity of oil = 21.6° A.P.I. = .924 sp. gr.

L = Length of polished-rod stroke, in. = 44.6.
N = s.p.m. = 21.2.

Solution:

A_p = Total area of plunger = 2.403 sq. in.

A_r = Mean area of rods

$$= \frac{4{,}050 \times .441 + 1{,}400 \text{ ft.} \times .601}{5{,}450}$$

$$= .482 \text{ sq. in.}$$

A_t = Mean area of tubing

$$= \frac{5{,}200 \times 2.468 + 265 \times 1.583}{5{,}465}$$

$$= 2.425 \text{ sq. in.}$$

W_r = Total wt. of rods = 4,050 × 1.63 + 1,400 × 2.26 = 9,765 lb.

Therefore:

$$S_p = 44.6 - \frac{12 \times 10^6 \times 2.403 \times .401}{30 \times 10^6} \left(\frac{1}{.482} + \frac{1}{2.425}\right) \times \left(\frac{L}{1{,}000}\right)^2$$

$$+ 1.93 \times 5.450^2/10^5 \times 21.2^2 \times 44.6 = 44.6 - 28.4 + 11.5 = 27.7 \text{ in.}$$

Solution of problems according to the Marsh-Coberly method may be simplified by the use of suitable graphs. Figs. 1 and 2 may be used for this purpose. Fig. 1 shows two curves from which the coefficient of stretch may be read directly. Curve A is for use where the plunger has a diameter of 1.5 in., and Curve B for plungers of 1.75-in. diameter. In both cases 2-in. tubing and ¾-in. rods are assumed. The gravities of oil covered by the chart range from 10° to 50° A.P.I.

Fig. 2 is called a nomographic chart, and in this case, if the coefficient of stretch and the depth are known, the stretch or loss of plunger stroke, according to Marsh, or from Equation 3, is found by placing a straight edge on the chart so as to connect the known coefficient of stretch and the depth; then read directly the stretch e, at the intersection of the straight edge with the central line.

Problem:

In the following table of well data the rods are ¾ in. and the tubing is 2 in. in diameter.

	Well numbers 1	2	3
Gravity of oil, A.P.I.°	38	11	30
Depth of well, ft.	6,000	3,000	4,500
Diam. of plunger, in.	1.5	1.75	1.75
Solutions:			
From Fig. 1, Curve A or B, Coefficient of stretch	.800	1.30	1.10
From Fig. 2, "e" or stretch, in.	29	12	23

Reference

1. H. N. Marsh, "High Volumetric Efficiency in Oil-Well Pumping and Its Practical Results," A.P.I. Prod. Bull. 207, pp. 47-61, 1931.

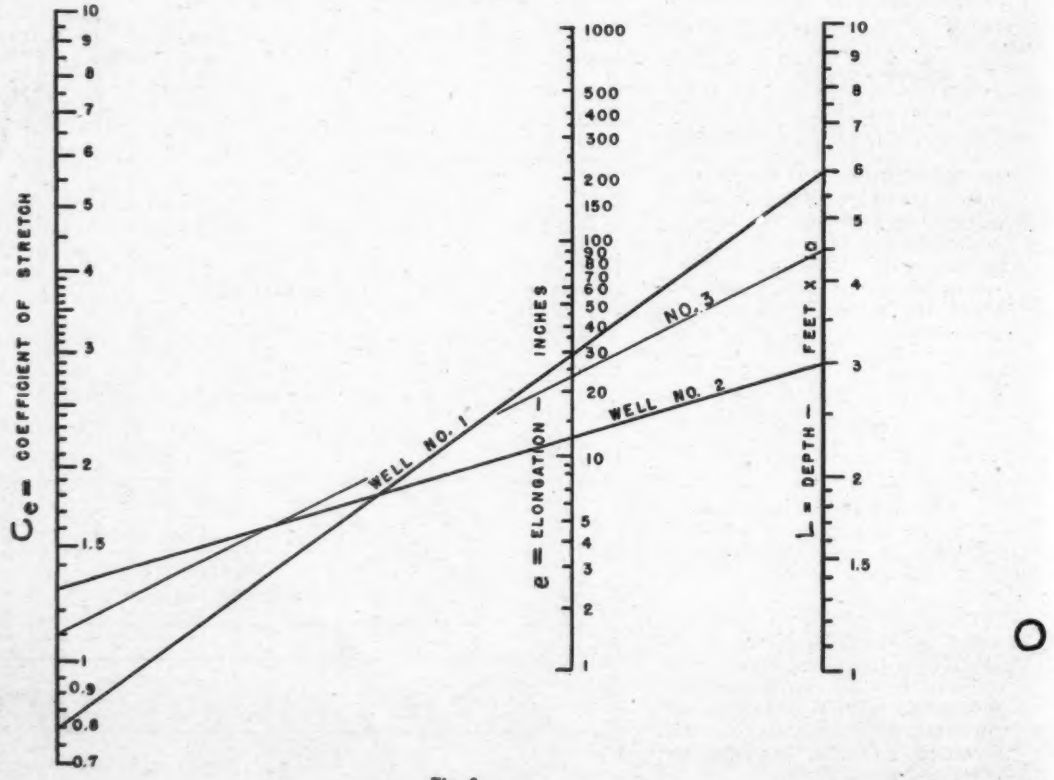


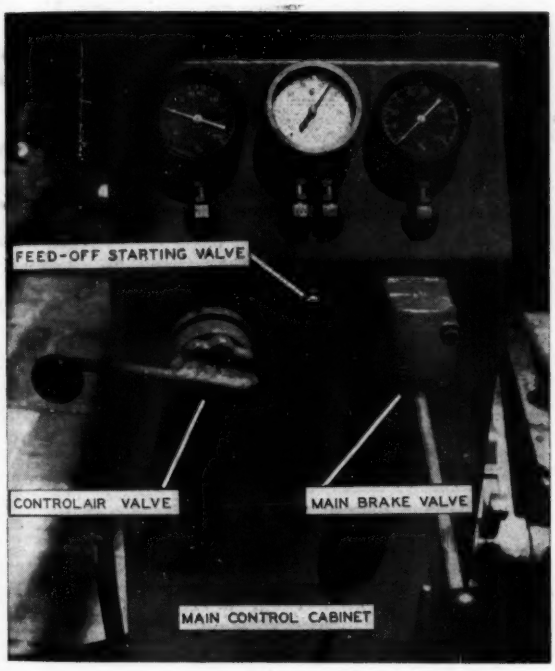
Fig. 2

OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

by John M. Spears

(1) AIR-OPERATED DRILLING BRAKES, for draw works and feed control, increase safety for drilling personnel and result in faster hole. Hydraulically controlled, feedoff is accomplished by throttling fluid movement in a simple closed hydraulic system, which will permit steady,



even feedoff rates of 0 to 65 ft. per hour with 10 lines on the blocks. Air supply is brought in to the auxiliary receiver located on derrick floor. From there it is piped to the main control cabinet and pilot valve. Just inside main control cabinet is placed a booster tank to insure ample supply of air directly at controls. All main controls are mounted in a cabinet (illustrated) with appropriate gages, and are manifolded to energize the various circuits as required by the different operating cycles. Main control cabinet is equipped with a main brake-valve lever, control air-valve knob, feedoff-trip pilot valve, and gages. When handle is latched in the first horizontal notch in the cover, sufficient pressure is applied to the bands to support block, hook, kelly, and one stand of pipe. Brake is latched at this position while making up or breaking out a drill-string connection. While drilling, selection of the method of feeding off drill pipe depends on penetration rate but change from one to the other can instantly be made at any time. *Kinzback Tool Co.*

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(2) NEW SWING-CHECK VALVE for high-pressure flow of oil, gas, steam, water, etc. Valve has all the advantages of the swing-check type without the disadvantages of "knocking" or "chattering." It is termed a vertical-swing horizontal check because gate or swing check is pivoted on a vertical pin. Weight of gate, therefore, is not a factor in closing valve. Neither does gate "float" on the liquid or gas causing it to flutter with the flow. Free flow is assured by large full-area rectangular passageways through valve. Instant closing is aided by flat stainless-steel spring mounted on back of swing gate. When flow ceases or is reversed the spring gives the initial force to swing gate quickly into the stream, instantly closing off the flow. *Falcon Products Co.*

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(3) NEW DRILLING MACHINE for hard drilling, such as loose-boulder and rock formation, is ruggedly built to take the severe shock of this type of drilling. A feature of the machine is the feeding capacity which can

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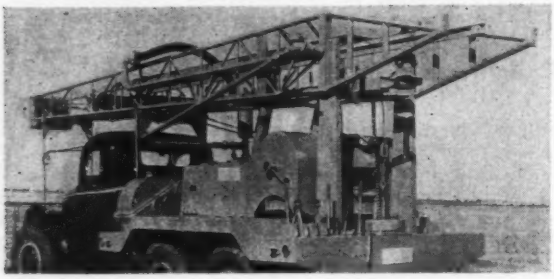
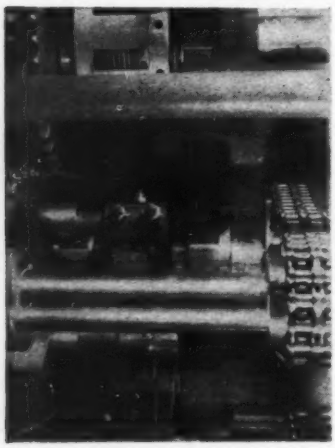
be used with a mechanical feed or gravity feed. Machine has a capacity of drilling 1,500 ft. using 2⅞-in. drill pipe with tool joints. Of special interest in the



construction is the power dividing case (illustrated). In it all sprockets, chains, and clutches run in a bath of oil. All shafts are mounted on antifriction bearings, equipped with grease seals. One endless chain drives five shafts, one of which is equipped with adjustment for tightening chain. A ¾-in. pitch double chain is used on feed - mechanism drive. Rotary has two speeds — high 240 r.p.m., low 130 r.p.m.—controlled by one lever. All clutch spiders are ball bearing mounted. Feed mechanism drive equipped with double Twin Disc clutch No. XA-3812 for forward and reverse drive. *Franks Machine Co.*

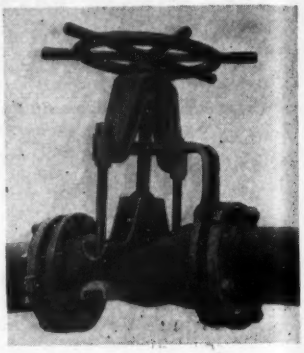


IT'S NEW CHECK IT

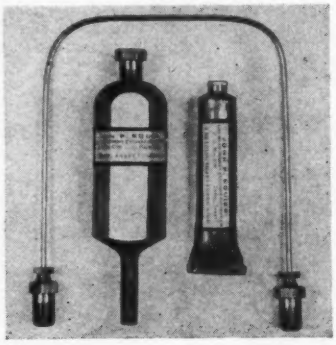
(4) SERRATED-FIN TUBING is used in fan-cooled units which cool jacket water, gas, and lube oil by blowing air through open sections made up with finned tubes. Serrated - fin design gives unusually high transfer rates on air side in relation to air pressure drop. Fins are copper and tubes are admiralty. Stock sizes are 5/6-in. and 1-in. o.d. 18 gage in 16 and 20-ft. lengths. Ends are stripped, polished, and reamed. *Cal-Fin Co.*

IT'S NEW CHECK IT

(5) DURABLE PINCH VALVES are used in transportation of abrasive and corrosive liquids at high temperatures where flow action is injurious to metal-type valves. Consists of a special rubber sleeve, with a clamping device easily operated by a large hand wheel. Sleeve or body of valve is made of moulded rubber, Neoprene, Ameripol, or other synthetic compounds which meet special requirements of corrosion resistance. Sleeve is reinforced with fabric. Moulded into inner surface are two recesses, or grooves, diametrically opposed, which form hinges for closing valve, preventing undue strains. Metal parts do not come in contact with liquids and mixtures of solids and liquids. Temperature changes produce no bad effects. *Mine & Smelter Supply Co.*



IT'S NEW CHECK IT



(6) ORIFICE-METER SHAFT LUBRICATOR automatically seals and lubricates differential - bearing shaft. Positive action is produced by utilization of differential across orifice plate. Reverse check valve prevents flow of lubricant into mercury chamber in the event of back flow of measured product. Special low-viscosity wet lubricant allows free action of bearing shaft, and perfect sealing at high pressures for periods from 1 to 3 years without attention. Designed for working pressures to 5,000 psi. Has weatherpoof plating and stainless-steel connections. *John P. Squier-Gas Measurement-Engineering Service.*

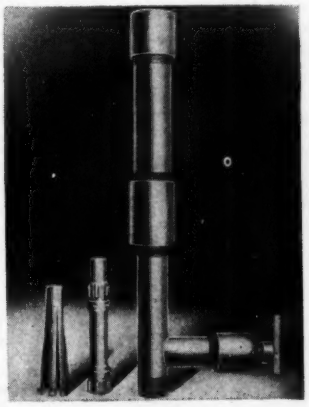
IT'S NEW CHECK IT

(7) PIPE INTERSECTION COMPASS is a layout tool used for accurately marking the lines of intersection on two pipes (of the same or different diameters) which are to be connected to each other in the form of a right angle, other angles, "Y's", etc. Compass has an adjustable center leg and a marking arm which slides up and down on the center leg. Center leg is set at angle desired for the intersecting pipe by means of a protractor near base of center leg.

Perpendicular distance between center of center leg and the marking point must always equal half the outside diameter of intersecting pipe. With distance kept correct and angle of intersection maintained while marking, it makes no difference at what angles or positions the supports and arms are set. Line of intersection of the two pipes will be every point at which marking point touches pipe. *Martindale Electric Co.*

IT'S NEW CHECK IT

(8) AUTOMATIC PARAFFIN KNIFE, for use in natural flowing well or wells operated by gas-lift equipment, operates on energy of tubing flow. Automatic operation of this knife eliminates necessity of periodically moving wire-line paraffin-cutting equipment to a well to cut paraffin and keep tubing open. Surface equipment is attached as a continuation of well-tubing outlet. Knife bumper housing contains two strong springs wound in opposite directions, one fitted within the other. On bottom of these springs is a rubber bumper. Immediately below this assembly is knife and catch housing, which contains the latch which automatically catches cutting knife when it flows to surface. Control of latch catches the knife after each run, if so desired, or permits knife to run continuously on intermittent flow. On continuous flowing wells, tubing is shut in and opened permitting knife to drop and return to surface. Knife has cutting edges and guides on both ends with a fishing neck on top. Knife cuts paraffin as it drops into the hole as well as when it is being returned to the surface. *Merla Tool Corp.*



IT'S NEW CHECK IT

(9) TELEGRAPH-CODE WRITER, for use by oil operators all over the world, will send perfect telegraphy in

code from 2 to 60 words per minute. Since code writer is similar in appearance and operation to an electric typewriter, inexperienced operators can send flawless and easily understood code. Writer is motor driven and may be equipped for any a.c. or d.c. voltage specified.

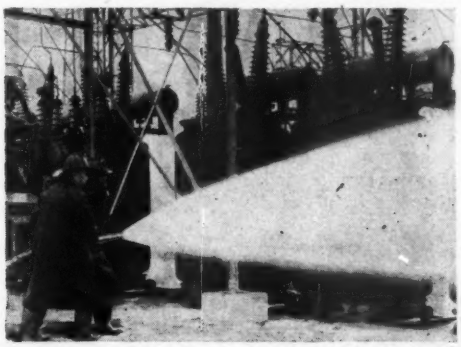
OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

Machines are available for International Morse code, American Morse code, or any other type of code. Ciphers may be easily adapted to the instrument for secret transmissions, using standard codes, by changing cams or by use of private code ciphers. *Selectograph Manufacturing Co.*

IT'S NEW CHECK IT

(10) NEW POWERON NOZZLE discharges a diffused stream of water which can be applied safely to a 250,000-volt live circuit. The included angle of discharge is 30° which forms a water curtain between operator and fire. Nozzle fits directly on to the hose, eliminating



any complicated play pipes, shutoffs, and other intervening equipment which may change the stream characteristics. It requires no adjustment. In appearance nozzle resembles closely a standard play pipe used in conjunction with stand pipe and hose-cart equipment found in many refineries and plants. *American-La France Foamite Corp.*

IT'S NEW CHECK IT

(11) MAN-SIZE BLOCK is designed as a 60-in. traveling block, but actually stands much higher. It is streamlined to assure accurate balance for straight fall and added safety. Compactly engineered, block allows maximum derrick working space. A large-diameter center pin assures strength and longer bearing life. Alloy steel sheaves with A.P.I. standard grooves are heat treated for maximum wear. New block is equipped with Hy-load roller bearings with Alemite lubrication. It has 200-ton capacity with ample safety factor. Can be furnished with adapter which may be connected to drilling hook with short rigid coupling. *McKissick Products Corp.*

IT'S NEW CHECK IT

TRADE LITERATURE

(12) VEE-FLEX PACKING RINGS. New two-color folder covers packing rings which are designed for obtaining maximum sealing qualities with finger-tight gland compression. They are used in rams, hydraulic lifts, etc., against hot and cold water, steam, gasoline, oils, air, and acids. Illustrated with sectional diagrams. *Raybestos Manhattan, Inc.*

IT'S NEW ✓ CHECK IT

(13) ANTIFRICTION BEARINGS. New 168-page manual, Number 15, is a combined engineering and application data reference volume for ball-radial, ball-reciprocating, radial-roller, taper-roller, and thrust bearings. Includes an A.F.B.M.A. method of numbering which facilitates recognition of bearing type and size. Covered by leatherette ring binder. *Torrington Co., Bantam Bearings Division.*

IT'S NEW ✓ CHECK IT

(14) DRAIN-HOLE DRILLING. Comprehensive engineering bulletin covers horizontal drain-hole drilling. It details the advantages of horizontal drilling by the Zublin method and is profusely illustrated with drawings of well formations, photos of the equipment necessary for horizontal drilling, and reviews the operations and theories involved. *Turbine Bit Co.*

IT'S NEW ✓ CHECK IT

(15) TUNE-O-LENE. Descriptive matter covers a new additive to motor oil for reducing friction and keeping high-compression engines free of gum, sludge, and carbon binder. It has a high flash and fire point, flows freely at subzero weather conditions, and has been very effective in the higher compression diesel engines. *Hobb Swetnam Co., Inc.*

IT'S NEW ✓ CHECK IT

(16) CONDENSER TUBE MANUAL is a compact ready reference on tubes used for condensers, heat exchangers, evaporators, and general piping found in plants, oil refineries, and process industries. It deals with the new and more corrosion resisting alloys such as Duronze IV, Cupro Nickel, Cruzinal, as well as improved admiralty, Muntz, and copper. Much space is given to the results of research and study of corrosion. *Bridgeport Brass Co.*

IT'S NEW ✓ CHECK IT

(17) METALLIC SOAPS. Interesting characteristics of metallic soaps, in particular the aluminum, ammonium, calcium, magnesium, and zinc stearates, are described in detail in 25-page indexed booklet. Individual soaps are described and their physical and chemical characteristics are noted. Also reviews important uses and gives suggestions on how they may be used most effectively. *Mallinckrodt Chemical Works.*

IT'S NEW ✓ CHECK IT

(18) FUEL OIL-GAS BURNERS. Bulletin No. 21 describes and illustrates steam-atomizing oil burners and auxiliary equipment for use with heavy oil or tar in boilers, stills, dryers, and other furnaces where steam or compressed air is available for atomizing oil. Furnace design and construction included in 15 pages. *National Airoil Burner Co.*

IT'S NEW ✓ CHECK IT

(19) LUBRICATED-PLUG VALVES. A 15-page, 2-color catalog describes steel lubricated-plug valves specially designed for high temperatures and pressures, and conforming to chemical requirements of A.S.T.M. specifications covering steel valves. General dimension and blueprint cross sections given. *American Car & Foundry Co.*

IT'S NEW ✓ CHECK IT

(20) DRILL PIPE, CASING, AND TUBING. New 64-page booklet describes in detail seamless drill pipe, casing, and tubing together with types of joints, weights, and dimensions, and setting depths. Features deoxidized Bessemer steel casing and tubing, warm worked casing, and threaded and coupled drill pipe. Many tables and six two-color graphs included. *National Tube Co.*

IT'S NEW ✓ CHECK IT

(21) QUIK-SIL ABSORBENT. How new oil and grease absorbent keeps oily, greasy floors dry is explained in four-page folder. Compound is fireproof and contains no sand or pumice. Illustrated. *The Diversey Corp.*

IT'S NEW ✓ CHECK IT

(22) SUBMERSIBLE PUMP. Printed and illustrated in three colors with photographs, parts diagrams, and tabular data, a 12-page bulletin covers deep-well turbine pumps and electric-motor units known as the "Submersible Pump," a motor-pump unit that operates entirely submerged in water at any depth, for pumping applications requiring capacities of 7,000 to 20,000 g.p.m. and heads to 1,500 ft. *Byron Jackson Co.*

IT'S NEW ✓ CHECK IT

(23) ROTARY PUMP. Folder outlines in detail advantages of new rotary. Such features as nonpulsating action, high pressure, low weight, low power requirements, high performance and high vacuum are described and illustrated with performance charts. *Eclipse Corp.*

IT'S NEW ✓ CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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NATURAL GAS

Mississippi River Fuel Proposes Expansion

WASHINGTON. — Mississippi River Fuel Corp. has applied to the Federal Power Commission for authority to construct and operate additions to its pipe-line system to increase delivery capacity 83,000,000 cu. ft. daily by the winter of 1948-49. Cost of construction has been estimated at $10,200,000 and would be financed by issuance of common stock and by bank loans.

The gas made available through the proposed additional facilities would be used by Mississippi River Fuel to meet the increased demands of its existing customers including both utility customers who buy gas for resale and industrial customers who buy gas for their own use. The application stated gas requirements for utility customers show unprecedented increases, primarily due to greater use for house heating, and new demands have made it necessary for the company to curtail industrial-gas deliveries.

Construction proposed by the company consists of a series of loop lines to provide two separate continuous pipe lines from the Perryville compressor station in Louisiana to St. Louis, and installation of an aggregate of 11,000 additional horsepower at the Perryville, West Point and Twelve Mile compressor stations. The looping would include about 189 miles of 22-in. line, 23 miles of 12-in. in 4-line manifolds at creek crossings, and 18½ miles of 10-in. in 6-line manifolds at river crossings. The loop lines would be constructed in a series of partial loops to connect existing and previously authorized sections along the main 22-in. line, and an extension of the Alton line loop to Granite City, Ill.

After installation of the facilities is completed, the company's total daily capacity would be 275,000,000 cu. ft. of gas at the Perryville station and its total sales capacity, 266,000,000 cu. ft. per day.

Gas is obtained by the company from Hope Producing Co., Interstate Natural Gas Co., Inc., Southern Carbon Co., United Carbon Co., and United Gas Pipe Line Co. All of these with the exception of United Gas Pipe Line will supply their contract requirements from Monroe field, Louisiana, under contracts expiring in 1951. By an agreement made during 1945, United Gas Pipe Line will supply its contract requirements from Carthage field in Texas, and in addition has contracted to supply Mississippi with its entire requirements if necessary for a period of 20 years.

Mississippi River Fuel's system commences at the compressor station in Perryville, La., and continues with a main trunk transmission line through Louisiana, Arkansas, and Missouri into Illinois. Principal sales take place in the vicinity of Alton and East St. Louis, Ill., and St. Louis. The company's main office is in St. Louis. Last September, FPC authorized Mississippi River Fuel to make additions to its system costing $11,605,000 and designed to increase sales capacity from 133,000,000 to 183,000,000 cu. ft. daily.

Pennsylvania Company Held Not Under FPC

WASHINGTON. — The Federal Power Commission has made public an order finding that Pike County Light & Power Co., Milford, Pa., is not subject to the commission's jurisdiction under the Natural Gas Act and dismissing the company's application for a "grandfather" certificate.

Pike County Light & Power owns and operates a local gas-distributing system in Matamoras, Pa., across the Delaware River from Port Jervis, N. Y. The gas distributed in Matamoras is purchased from the Rockland Light & Power Co., the distributor in Port Jervis. Such gas is transported over the Delaware River by a line extending across a bridge connecting the two towns. The portion of the line on the New York side is owned by the Rockland company, and the portion on the Pennsylvania side, extending from the middle of the bridge, is owned by Pike County Light & Power.

East Ohio Expects Hike In Inch-Lines Allotment

CLEVELAND.—East Ohio Gas Co., which now receives approximately 33 per cent of the natural gas transmitted via the Big Inch system, eventually may obtain as much as 50 per cent.

The possible increase was announced by J. French Robinson, president of East Ohio, following conferences in New York with officials of Texas Eastern Transmission Corp., recent high bidder in the Government's sale of the lines.

New Company Building Kansas Gas Plant

The newly formed A. R. Jones Oil & Operating Co., which recently purchased the government helium plant at Cunningham, Kans., is building a new plant 2 miles south and 14 miles west of Great Bend.

The new plant will take sour gas from the Pawnee Rock, Behrens, and Ryan pools and deliver it to the desulfurization plant of Northern Natural Gas Co. near Otis. Nine compressors from the helium plant are being installed in the new plant which will be ready to take gas about March 1. Eventually, about 30,000,000 cu. ft. will be handled daily. The project is estimated to cost $1,000,000.

Swensrud Scores Federal Control Over Gas Prices

CLEVELAND.—Regulation of prices of natural gas by the federal Government will tend to drive producers out of business by allowing them too small a margin of profit, Sidney A. Swensrud, executive vice president of Standard Oil Co. (Ohio), declared here recently.

Swensrud said the price formula of the Federal Power Commission, "if carried to its logical extreme," will mean "that interstate gas pipe lines will have no source of supply when present contracts run out. The producers will have little interest in selling gas," he declared.

J. French Robinson, president of East Ohio Gas Co., agreed with Swensrud on the effects of government control and said the natural-gas industry now is drafting a proposed amendment to the Natural Gas Act to deny FPC authority to regulate prices.

Consolidated to Expand

NEW YORK.—Plans to spend about $50,000,000 in 1947 and 1948 to increase plant facilities have been made by Consolidated Natural Gas Co. Officials said the expansion of facilities is required by increased use of natural gas for heating homes.

Laboratory Being Built

Lone Star Gas Co.'s chemical-testing laboratory being built in the company's warehouse in Dallas is scheduled for early completion. The laboratory occupying a 38 by 80-ft. space, includes five working laboratories, a utility room, a library, two offices and lounges, and storage space. Thomas S. Bacon, Lone Star research engineer, and members of his staff will use the new laboratory for testing and research work.

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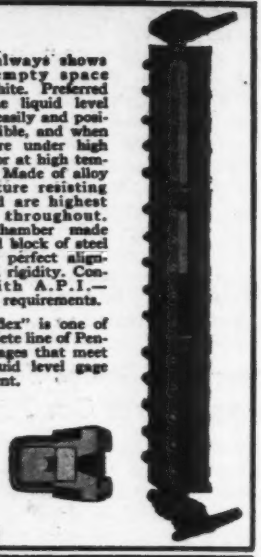

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REFINING

Important Sessions Set For W.P.R.A. Meeting

Outstanding papers by technological leaders on important process developments in the refining industry will signalize the technical sessions of the meeting of the Western Petroleum Refiners Association in San Antonio, March 24-26, according to recent announcement by R. R. Irwin, chairman of the manufacturing committee. The meeting will be held at the Plaza Hotel.

One important paper will be that of T. H. Risk, Ethyl Corp., who will discuss "Motor Fuel Trends in Relation to Antiknock Requirements," a subject of primary importance to all refiners. This paper will be given at the session Tuesday, March 25, under the chairmanship of L. D. Mann, of Cities Service Refining Co. On the same day a discussion panel will be held, on "Catalytic Cracking," probably the most significant subject now in the minds of refining operators and executives. The engineering section of the panel will include representatives of Phillips Petroleum Co., Houdry Process Corp. and Universal Oil Products Co., all licensors of the current catalytic-cracking processes. The operator's section will include a representative plant operator from each of the processes represented in the engineering section, and both sections will endeavor to answer questions propounded by interested refiners and others.

On Wednesday, two papers will be given. The so-called Hydrocol process for the synthesis of hydrocarbons from natural gas by the Fischer-Tropsch reaction will be discussed by P. C. Keith, president of Hydrocarbon Research Corp. Developments in "Petroleum Chemicals" will be presented by M. B. Chittick, of Pure Oil Co.

Three Bids Received for Old Ocean, Tex., Refinery

The offer by War Assets Administration of the J. S. Abercrombie & Harrison Oil Co. refinery at Old Ocean, Tex., last week drew three bids, on which a decision will be made by officials in Washington.

The bids included: Stanolind Oil & Gas Co., Tulsa, $7,000,000 cash; Premier Oil Refining Co. and Sklar Oil Co. of Texas, joint bid, $1,000,150 cash; and Claton N. Smith, Houston independent, rental of the property for 5 years on a sliding scale based on production, with an option to purchase for $13,500,000 at the end of the lease.

The WAA last week also announced for sale a unit at Texas City, Tex., operated during the war by Pan American Refining Corp. to manufacture isopentane, and one at Beaumont, Tex., operated by Magnolia Petroleum Co. in the production of toluene. Bids will be received until March 17.

Texas Plant Completes New Unit Installations

Wickett Refining Co. has completed construction of a desulfurization unit at its refinery at Wickett, Tex. The unit, constructed and engineered by company employes, has a gasoline capacity of 700 bbl. per day, according to E. L. Kent, manager.

Company officials are studying

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changing the catalyst and making it into a Phillips Perco unit. The company also completed installation in December of a Petreco electric crude desalter with a daily capacity of 3,000 bbl. The refinery has a crude-oil capacity of 2,500 bbl. daily.

Tables Turned, Houston Now Importing Gasoline

HOUSTON.—This Gulf Coast port, which during the war exported millions of barrels of aviation gasoline, recently received its first tanker of imported fuel, brought by the Silver Creek from Liverpool, England.

The shipment, which totaled 129,249 bbl., was consigned to the Army Air Forces. Government officials said it was the first of several shipments of fuel to be brought back from England to this country A second tanker is expected later in February.

Grease Institute to Meet October 16-18 in Chicago

The fifteenth annual convention of the National Lubricating Grease Institute will be held October 16-18 in the Edgewater Beach Hotel, Chicago, Carl E. Bolte, executive secretary of the institute, has announced.

The program committee under Chairman J. R. Corbett, Cato Oil & Grease Co., Oklahoma City, is already working out a 2-day program of technical papers, to be followed on the third day by a symposium under the direction of the institute's technical committee. The hotel has guaranteed a larger number of rooms for members attending the meeting than have been allotted formerly.

Gas Turbines Under Intensive Navy Study

A heretofore highly secret gas-turbine model which is being operated at 1,350° F., the highest temperature yet reached in such power plants in this country, was demonstrated recently at the Naval engineering experiment station, Annapolis, Md., where the turbine has been under experimental study for 2 years.

Navy engineering leaders "visualize the introduction of the gas turbine into many of its (the Navy's) fighting ships," said Vice Adm. Earl W. Mills, representing Vice Adm. E. L. Cochrane, chief of the Bureau of Ships.

This eventual development is expected to materialize within 5 to 10 years, the Navy believes. Naval propulsion power units must be extremely reliable for long periods and to give the highest degree of maneuverability. Present plans call for boosting the operating temperature to 1,500° F. Because of the higher-temperature operating level of the gas turbine, its operating efficiency can be made considerably higher than can the steam engine or steam turbine. Elimination of steam boilers, condensers, and such auxiliary equipment reduces the over-all weight per horsepower of the prime mover.

Within a few years gas turbines are expected to be adapted to generation of electric power for power stations, ships, and other commercial and industrial installations and eventually to be applied to locomotives and planes as well. All gas turbine research and testing for the Navy will be concentrated at Annapolis where the new engineering experiment station will be completed in July.

CWS Torsiometer Report Now Available to Industry

WASHINGTON.—A description of a torsiometer developed by the Chemical Warfare Service for measuring the consistency and elasticity of gel-type incendiary mixtures, is contained in a report now being issued by the Office of Technical Services of the Department of Commerce.

The device was developed when conventional viscosimeters were found to be unsatisfactory for standardizing the mixture used in incendiary bombs. According to the report, it may be used in the study of other viscous materials.

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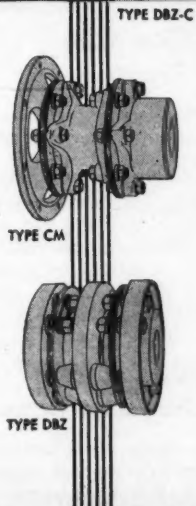

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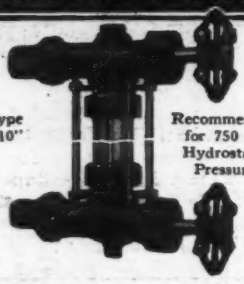

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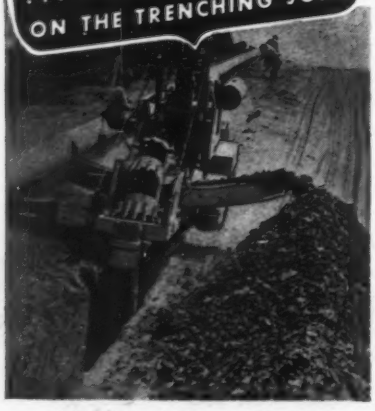

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PIPE LINES

Stanolind to Contract 16-In. Line March 7

Stanolind Pipe Line Co. has issued specifications and will take bids March 5 for contract letting March 7 for the construction of 80 miles of 16-in. to extend the company's system in West Texas. Pipe is expected to start arriving March 1; construction work will commence in the middle of April.

Engineering for Wyco Pipe Line Co. (Standard of Indiana, The Texas Co., and Socony-Vacuum Oil Co., Inc.,) is being handled by Stanolind Pipe Line Co. For the Wyco 267-mile, 8-in. products line connecting Casper and Cheyenne, Wyo., and Denver, it is anticipated that contracts will not be let until May.

Ohio Fuel Gas to Lay 45-Mile, 16-In. Line

Ohio Fuel Gas Co. awarded a contract for a 45-mile, 16-in. line near Columbus, Ohio, to Midwestern Constructors.

All of the pipe has been delivered to the Hill-Hubbell & Co. plant for coating with enamel and wrapping with asbestos felt and kraft paper. By April 1 Midwestern will start laying pipe. Contractor's operations will be in charge of Carl Bills, spread superintendent.

Magnolia Gets CPA Permit for Program

Magnolia Pipeline Co. will build a $3,531,000 products pipe-line system connecting Beaumont, Houston, Austin, Waco, Dallas, and Fort Worth, according to plans outlined in a CPA permit granted in Houston last week.

All but $50,000 will be used for equipment. In addition a pumping station, an office building, and a warehouse will be constructed.

Flame Priming of Pipe Tested at Augusta, Kans.

Experiments have been carried on recently at the yard of the pipe-line department of Socony-Vacuum Oil Co., Inc., (White Eagle division) in Augusta, Kans., to test the possibilities of flame priming of pipe to prepare for coating operations.

Flame priming was done ahead of the cleaning machine on approximately 11 miles of 4-in. uncoated pipe which had been dug up and brought to the Augusta yard. Oxyacetylene flames applied by special Linde equipment loosened dirt and scale and also heated the pipe immediately preceding coating operations. As a result of this pioneering test, some changes are being made in the procedure to adapt it to the requirements of commercial operation.

Utah Adds Two Temporary Stations

Two temporary booster stations were added to the Salt Lake City line of the Utah Oil Refining Co., pipe-line division early in January. The stations were added at North Baxter Basin and Evanston, Wyo. Shipments westward from Wamsutter have totaled 21,000 bbl. daily to Utah Oil Refining Co. and Wasatch and Idaho refineries, Salt Lake City and Pocatello, Idaho. With the addition

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of these two stations it will be possible to move at least 23,000 bbl. daily. The new temporary stations are housed in Quonset huts which are serving satisfactorily.

Florida Pipe Line Placed On Market by WAA

WASHINGTON.—War Assets Administration is inviting bids for the purchase or lease, in whole or in part, of two rail-water terminals and a 200-mile pipe line in Florida, constructed and operated to meet German submarine activity off the Atlantic Coast during the war.

The terminals, formerly operated by the General American Transportation Corp., are located near Panama City and Jacksonville and cost the Government approximately $5,000,000. The pipe line was formerly operated by the Florida Emergency Pipeline Co. to transport petroleum products from Timber Island, near Carrabelle, to barge-terminal facilities on the St. John's River near Jacksonville. It cost $4,200,000.

Offers to buy or lease may be for on site use or for relocation and use elsewhere.

The Panama City terminal, used as a receiving plant for oil arriving by barges via the Intra-Coastal Waterway, is a self-contained operating unit on a 404-acre site on the south side of St. Andrews Bay (North Bay), about 15 miles from the inlet to the Gulf of Mexico. It is equipped to receive 50,000 bbl. daily and to store 575,000 bbl.

The other terminal, possibly the largest potential water-front tract in the vicinity of Jacksonville, is about 8 miles from the city. It is equipped to receive 25,000 bbl. of oil daily and has a storage capacity of 270,000 bbl. in two 80,000 bbl. and two 55,000 bbl. steel tanks fitted with suction lines and suction heaters.

The pipe-line project includes approximately 200 miles of 8⅝-in. o.d. steel pipe and industrial and housing facilities at each of seven pumping stations located at Carrabelle, Wakulla, Lamont, Madison, Live Oak, Lake City, and MacClenny. In operation, 27,000 bbl. were put through the line daily. There are eight storage tanks at Carrabelle with a total capacity of 330,000 bbl. and a 5,000-bbl. tank at each pumping station.

Credit terms may be arranged and special consideration will be given to small business, WAA said. Sealed proposals for the Panama City terminal will be received at the WAA Regional Office, Jacksonville, until 10:00 a.m., April 14. Those for the Jacksonville terminal and pipe line must be received by 3 p.m. (E.S.T.), April 11, at P.O. Box 4129, Jacksonville.

Border Pipe Line Co. Given FPC Certificate

WASHINGTON. — The Federal Power Commission has determined that Border Pipe Line Co.'s construction and operation of facilities in Texas for exportation of natural gas from the United States to Mexico make it subject to FPC jurisdiction under the Natural Gas Act and has issued the company a certificate of public convenience and necessity authorizing it to continue operation of a 1,100-hp. compressor station in Jim Hogg County, Texas, and a 38-mile, 8⅝-in. line from the station to the eastern bank of the Rio Grande River about 7 miles south of Laredo, Tex.

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STATISTICS and T

WEEKLY WELL COMPLETIONS . . . WEEK ENDED FEBRUARY 22, 1947

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1947				
	Comp.	Oil	Gas	Dry	Footage	1947	1946	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	24	12	0	*12	38,412	215	229	0	0	0	0	0	0	0	0	0	0
Pennsylvania	58	32	2	†24	88,160	493	665	0	0	0	0	0	0	0	0	0	0
West Virginia	12	2	6	4	32,475	129	88	0	0	0	0	0	0	0	0	0	0
Ohio	17	5	9	‡3	51,244	187	156	0	0	0	1	1	0	0	1	6	7
Indiana	4	2	0	2	7,830	56	44	0	0	0	1	1	1	0	0	5	6
Kentucky	6	1	0	5	12,946	55	64	0	0	0	2	2	0	0	0	8	8
Illinois	39	25	0	14	97,858	281	288	3	0	0	3	6	12	0	0	46	58
Michigan	9	5	0	4	21,928	101	100	0	0	0	3	3	0	0	3	38	41
Kansas	59	25	20	14	181,690	398	324	0	0	1	4	5	8	0	4	39	51
Neb., Mo., Iowa	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	1	1
Oklahoma	87	45	1	41	252,554	614	372	1	0	0	22	23	14	0	1	128	143
Texas	170	97	18	55	750,037	1,153	1,152	3	0	0	19	22	35	5	12	171	223
North Central	58	31	0	27	180,142	374	386	2	0	0	7	9	15	0	4	62	81
West	33	25	1	7	197,844	279	251	1	0	0	2	3	2	0	1	25	28
Panhandle	22	10	9	3	68,444	71	59	0	0	0	0	0	1	0	0	1	2
Eastern	6	3	2	1	38,539	72	106	0	0	0	1	1	1	0	0	17	18
Gulf Coast	24	16	2	6	142,971	231	276	0	0	0	3	3	11	5	6	32	54
Southwest	27	12	4	11	122,097	126	74	0	0	0	6	6	5	0	1	34	40
Louisiana	23	19	0	4	116,294	176	176	1	0	0	0	1	7	3	0	22	32
Northern	10	7	0	3	22,138	83	89	0	0	0	0	0	0	0	0	13	13
Southern	13	12	0	1	94,156	93	87	1	0	0	0	1	7	3	0	9	19
Arkansas	2	1	0	1	7,772	32	26	0	0	0	0	0	0	0	0	6	6
Mississippi	4	2	0	2	30,974	52	33	0	0	0	1	1	0	0	1	16	17
Southeastern States	1	0	0	1	3,146	9	8	0	0	0	1	1	0	0	0	8	8
Montana	4	1	3	0	6,753	27	39	0	0	0	0	0	0	0	0	4	4
Wyoming	6	5	0	1	47,447	33	29	1	0	0	0	1	3	0	1	7	11
Colorado-Utah	0	0	0	0	0	21	16	0	0	0	0	0	1	0	0	4	5
New Mexico	9	6	2	1	29,612	72	64	0	0	0	0	0	1	0	0	8	9
California	36	25	2	9	142,135	298	270	0	0	0	6	6	2	0	0	45	47
Total United States	570	310	63	197	1,909,267	4,403	4,146	9	0	1	63	73	84	8	23	562	677
Total previous week	594	313	76	205	2,070,952	3,833	3,640	14	0	7	92	113	75	8	22	499	604
Total Feb. 23, 1946	506	301	59	147	1,774,476			10	1	4	43	58	60	2	21	464	547

Service wells included: *12, †23, ‡1.

MARKET QUOTATIONS

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.17			
19-19.9	1.21			
20-20.9	1.24	$1.30		$1.17
21-21.9	1.28	1.32		1.19
22-22.9	1.32	1.34		1.21
23-23.9	1.35	1.36		1.23
24-24.9	1.39	1.38	$1.61	1.25
25-25.9	1.43	1.40	1.63	1.27
26-26.9	1.46	1.42	1.65	1.29
27-27.9	1.50	1.44	1.67	1.31
28-28.9	1.54	1.46	1.69	1.33
29-29.9	1.57	1.48	1.71	1.35
30-30.9	1.61	1.50	1.73	1.37
31-31.9		1.52	1.75	1.39
32-32.9		1.54	1.77	1.41
33-33.9		1.56	1.79	1.43
34-34.9		1.58	1.81	1.45
35-35.9		1.60	1.83	1.47
36-36.9		1.62	1.85	1.49
37-37.9		1.64	1.87	1.51
38-38.9		1.66	1.89	1.53
39-39.9		1.68	1.91	1.55
40 and above		1.70	1.93	1.57

*For crude from Daboval, El Campo, and Sandy Point. †Includes Lea County, New Mexico.

(Quotations shown here are f.o.b. plant in tank cars and in cents per gal. as of last Monday.

REFINERY GASOLINE

Octane (A.S.T.M.)	78-80†	73-75
Mid-Continent*	7.500-7.750	6.875-7.250
Tex. Gulf Coast	7.50-7.75	6.750-7.125
New York Harbor	9-10.75	8-9.25

*Basic Oklahoma Group 3. †1939 C.F.R. (research method).

NATURAL GASOLINE

Grades—	26-70	18-55
Oklahoma (Group 3)	5.125	6.150
N. Texas (f.o.b. plant)	4.625	5.550
N. Louisiana (f.o.b. plant)	4.875	5.850

CRUDE-OIL PRICES

Representative posted schedules per bbl.

East Texas	$1.70
Kettleman Hills, California*	1.69
Beauregard Parish	1.65
Illinois Basin	1.82
Pecos County, Texas (Yates)	1.40
Bradford, Pennsylvania	3.65
Eastern Ill., and Western Ind.	1.67
Tomball, Texas Gulf Coast	1.85

Note: Crude prices exclusive of subsidy.

A.P.I. REFINERY REPORT

Week ended February 15, 1947

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Distillate	Residual
East Coast	732	21,759	15,655	6,691
Appalachian	170	3,672	511	338
Ill., Ind., Ky.	805	20,563	3,319	2,665
Okla., Kan., Mo.	384	10,410	1,510	1,084
Inland Texas	215	4,272	333	688
Tex. Gulf Cst.	1,099	15,739	7,365	5,834
La. Gulf Cst.	348	5,292	2,539	1,780
N. La., Ark.	52	2,145	570	101
Rocky Mtn.	139	2,813	510	694
California	793	16,383	10,481	26,640
Total 2-15-47	4,737	103,048	42,793	46,515
Total 2- 8-47	4,785	101,705	45,093	47,537
Total 2-16-46	4,669	105,297	27,392	40,041

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
February 15, 1947	222,013,000
February 8, 1947	220,313,000
February 16, 1946	224,762,000

*Excludes unrefinable Calif. stocks.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

	Feb. 22 crude oil	B. of M. Feb. demand	Feb. 15 crude oil
Alabama	900	1,200	1,000
Arkansas	80,500	76,000	80,100
California	901,500	838,000	898,500
Colorado	38,710	33,000	38,500
Eastern	59,000	64,200	56,500
Florida	240	200	240
Illinois	191,000	204,000	186,900
Indiana	17,700	18,000	17,400
Kansas	280,350	263,000	280,650
Kentucky	27,000	28,000	27,000
Louisiana	412,500	387,000	412,700
North Louisiana	102,200	.....	102,400
South Louisiana	310,300	.....	310,300
Michigan	41,760	46,000	39,380
Mississippi	82,685	66,000	86,035
Montana	24,400	23,000	23,920
Nebraska	700	800	700
New Mexico	103,400	98,000	103,400
Oklahoma	370,050	370,000	370,150
Texas	2,056,665	2,030,000	2,056,665
District 1 (Southwest)	19,950	.....	19,950
District 2 (Southwest)	146,025	.....	146,025
District 4 (Southwest)	223,250	.....	223,250
District 3 (Gulf Coast)	451,000	.....	451,000
District 5 (Eastern)	36,440	.....	36,440
District 6 (Eastern)	106,100	.....	106,100
East Texas field	328,200	.....	328,200
District 7-C (West)	32,665	.....	32,665
District 8 (West)	467,455	.....	467,455
District 7-B (W. Central)	36,100	.....	36,100
District 9 (N. Central)	126,355	.....	126,355
District 10 (Panhandle)	83,125	.....	83,125
Wyoming	109,250	93,000	104,860
Miscellaneous	.....	600	.....
Total United States	*4,798,310	4,640,000	4,764,600
Change from prev. week.	up 33,710		

Total production January 1-February 22 ..... †250,319,140 bbl.
Same period last year (crude plus condensate).. 253,741,780 bbl.
*Not incl. 26,420 bbl. condensate. †Incl. 1,363,140 bbl. condensate.

CRUDE-OIL STOCKS 222,013,000 bbl. as of February 15—up 1,700,000 bbl. One year ago 224,762,000 bbl.

GASOLINE STOCKS 103,048,000 bbl. as of February 15—up 1,343,000 bbl. One year ago 105,297,000 bbl.

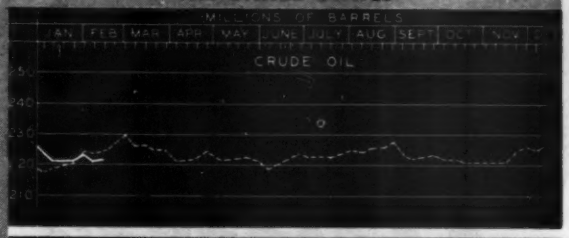
RESIDUAL FUEL-OIL STOCKS 46,515,000 bbl. as of February 15—down 1,022,000 bbl. One year ago 40,041,000 bbl.

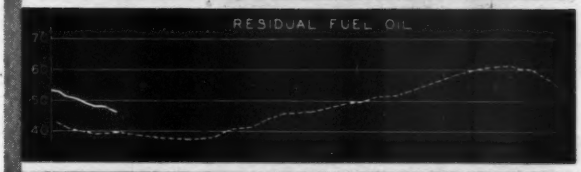
GAS OIL AND DISTILLATE STOCKS 42,793,000 bbl. as of February 15—down 2,300,000 bbl. One year ago 27,392 bbl.

CRUDE-OIL PRODUCTION 4,798,310 bbl. as of February 22—up 33,710 bbl. One year ago 4,704,520 bbl.

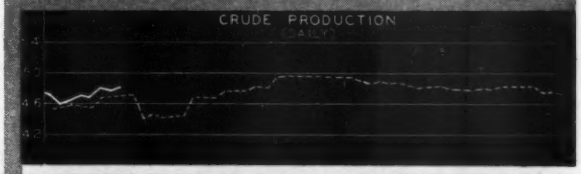
REFINERY RUNS 4,737,000 bbl. daily week ended February 15—down 48,000 bbl. One year ago 4,669,000 bbl.

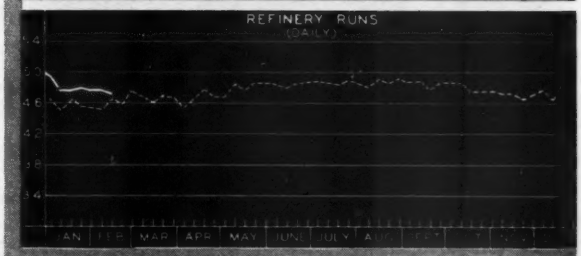
OIL STOCKS IN THE UNITED STATES



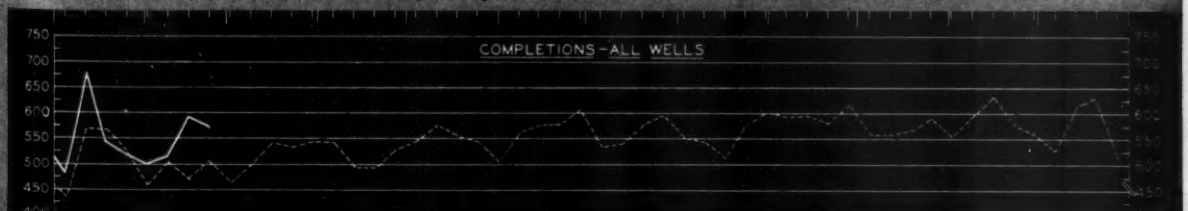


DAILY OPERATIONS

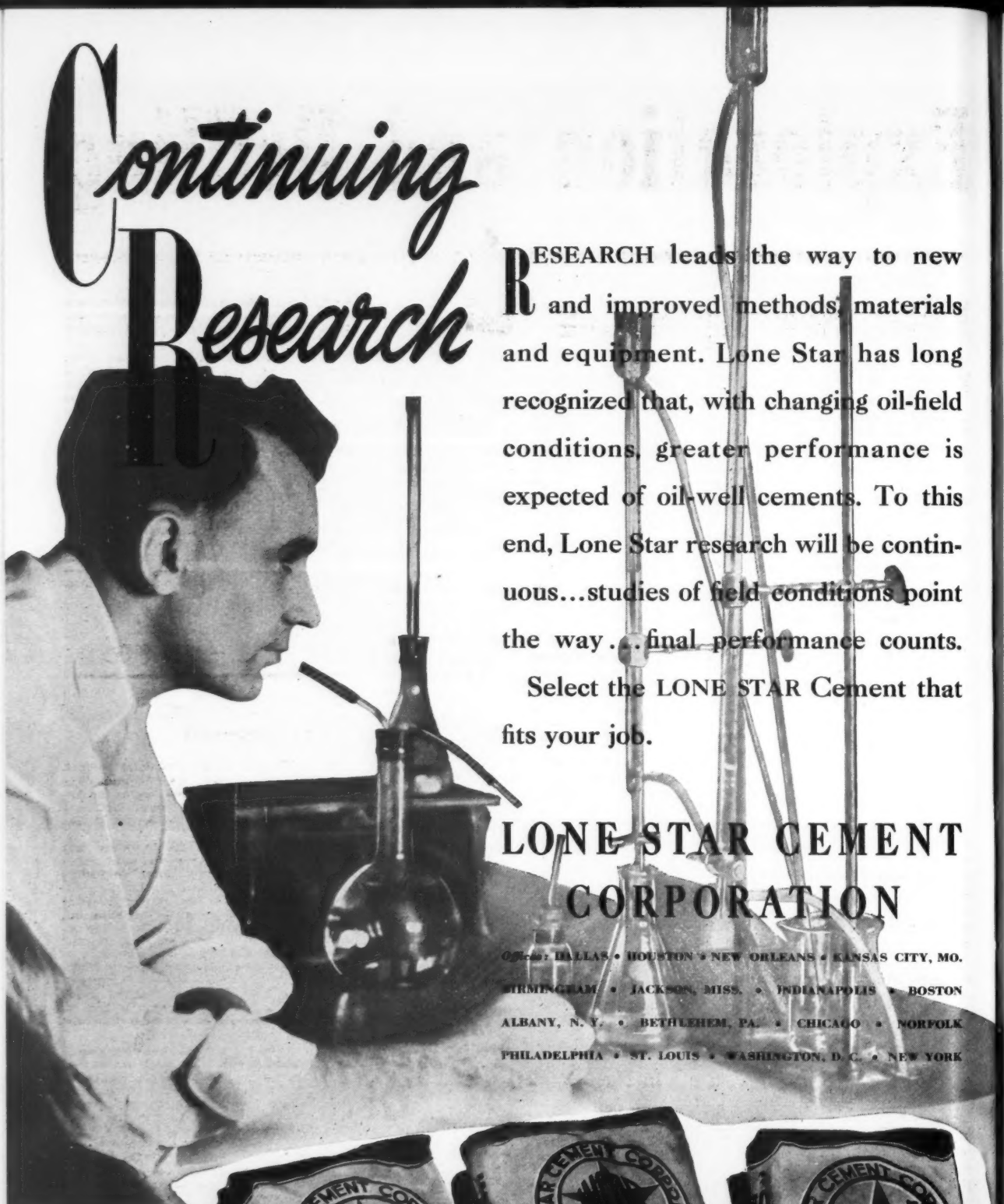




Solid line charts weekly completions, service wells in Eastern area included.



Continuing Research



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Exploration and Drilling

Radar, New Exploration Tool

DURING the war years, the geophysicists actually lost ground in terms of normal progress in their field of science, due to concentration on military devices. Now that they are feverishly trying to make up for lost time, it is only fair that war-developed Shoran radar should develop into a useful tool which will speed work in several fields of geophysical activity.

Oddly enough, this newest scientific development, radar, promises to be most useful in the oldest engineering job of record, making surveys. Shoran radar, (see The Oil and Gas Journal, July 6, 1946, page 74), in essence is nothing but a method of using waves that travel with the speed of light for a measuring device in a system of triangulation. But it can be useful in connection with an airplane, and thereby offers the key to the solution of many geophysical operating problems.

Surveying and the length of time required, plus the manpower, is already the bottleneck as far as speed and general cost are concerned in using any geophysical reconnaissance instrument. If this is true of instruments that are operated on the ground, it is easy to see how the problem is multiplied and complicated when it is proposed to put geophysical instruments in airplanes or helicopters. To speed up the number of observations that can be made in a given length of time by use of an airborne vehicle does little good if completion of the job is still tied to earthbound methods of surveying.

In the airborne magnetometer, the industry already has one reconnaissance geophysical instrument that will work when mounted in a plane. But without Shoran radar, even where the terrain is such that position fixes can be obtained by other methods, the surveying or position determination job consumes much more time than magnetic determinations. Over water or jungle, or featureless terrain, radar seems to offer the only hope.

It is known that experiments have been, or are about to be made in the use of the gravity meter in planes and helicopters. There are no particular scientific obstacles to such a development, even though technological and adjustment quirks may have to be ironed out. But what benefits can be derived from speeding up the gravity meter observation party unless the surveying job can be speeded up? Even now, it requires two ground-survey parties to keep up with one ground gravity-meter observation crew. (See The Oil and Gas Journal, February 22, 1947, page 122).

In Continental Shelf exploration work now going on around the Gulf of Mexico, lack of sufficient radar equipment is one important factor in keeping the number of geophysical crews below the goal several companies would like to reach. The crews that are so equipped are known as the 30-m.p.h. crews, because of the speed with which they can cover territory when the surveying bottleneck is cracked by using radar equipment.

In the exploration work now going on in the Bahamas, radar is being used in connection with airborne-magnetometer surveys. Incidentally, a new precedent is believed to have been established in this work, in that the several companies owning concessions are reported to be jointly contributing to the cost of the magnetic survey, with the results over the entire area available to all the contributors.

LA.-ARK.

New Depth Record Set In North Louisiana

SHREVEPORT.—The Cotton Valley Operators Committee, in deepening the 2 Oliphant-Banks, 34-21n-10w, in the Cotton Valley field of Webster Parish, had exceeded the depth record of North Louisiana set by the Carter-Burton discovery well in the Plain Dealing field which was drilled to 12,365 ft. The 2 Oliphant-Banks was last reported fishing stuck drill pipe at 11,430 ft. with total depth at 14,976 ft. in salt.

D. B. McConnell et al 1 S. L. Herold, Section 5-7n-11w, last week was ready to complete as a large gasser. Completions tests were to be made from both the Pettit zone at 5,075-5,150 ft., which alone was said to exceed the capacity volume of the pipe, and from the Jeter sand at 4,270-4,310 ft. On state tests the well flowed 123,000,000 cu. ft. of gas a day from the Pettit, on open flow, and when shut in the pressure registered 1,767 lb. After cleaning itself, packer was set at 5,075 ft. and perforations made at 4,270-4,310 ft. Operators were installing side-door chokes before making completion tests from the Jeter sand. Total depth is 5,946 ft.

In Union Parish, 9 miles northeast of the Knowles field, The California Co. 1 W. E. Weldon, 24-21n-3w, was taking cores below 7,880 ft. At 7,780-89 ft. the recovery was dark gray-green sandy shale with oyster shells, and 6 in. of medium-grained brownish sand with fairly good porosity, good permeability and a gas-distillate odor. Top of the sand was placed at 7,788 ft. Cores to 7,789-7,800 ft. recovered medium to coarse sand, very porous, showing gas-distillate, and having good permeability. A drill-stem test at 7,780-7,800 ft., open 10 minutes, recovered 11 stands of water-cushion cut with gas and distillate, 210 ft. of mud cut with gas and distillate, and 180 ft. of salt water. Flowing bottom-hole pressure was 3,625 lb., and shutin pressure rose to 3,700 ft.

APPALACHIAN FIELD

West Virginia Test To Be Deepened

PITTSBURGH.—In Williamsburg district, Greenbrier County, West Virginia, The Texas Co. made a drill-stem test of the important wildcat on G. R. Dean farm and there was a showing of 40,000 cu. ft. gas from the Oriskany sand. From a surface elevation of 2,575 ft., the Oriskany was logged at 6,538-72 ft. with the sand tested at 6,443-66 ft. However, after subjecting the Oriskany to the heavy column of rotary mud and water, that formation being very susceptible to water and mudding off, the gage shown indicates only the presence of gas. It is reported that the test will be deepened to the Clinton sand.

In Otter district, Braxton County, Pittsburgh & West Virginia Gas Co. completed No. 2 John Burk showing for 50 bbl. a day from the Big Lime. Total depth is 1,563 ft. This is their second good well in that district this winter.

In Slab Fork district, Raleigh County, Owens Libby Owens Gas Dept. abandoned 746 Western Pocahontas Corp. at 6,504 ft. or 36 ft. in the Corniferous chert after running into a bad fishing job. The Corniferous at 4,683 ft. was 87 ft. lower on structure than in a previous test.

In Ripley district, Jackson County, Columbian Carbon Co. is drilling through the Oriskany sand in the test 930 J. E. Combs with a high gage of 862,000 cu. ft. The surface elevation is 859 ft., Corniferous lime 4,892 ft., Oriskany 4,989 ft. Here, this company topped the Corniferous at 4,886 ft. from a surface elevation of 831 ft. in the test 926 W. M. Riley.

In DeKalb district, Gilmer County, Carnegie Natural Gas Co. completed a fair well in 1,631 Floyd Furr which gaged 900,000 cu. ft. gas from the Salt sand topped at 1,160 ft.; gas 1,206-18 ft., total depth 1,219 ft.

New locations totaled 12 and in Birch district, Braxton County; Cross Creek district, Brooke County; DeKalb and Glenville districts, Gilmer County; Ripley district, Jackson County; Carroll and Duval districts, Lincoln County; Harper district,

Roane County; Buckhannon district, Upshur County; Union district, Wayne County, and Reedy district, Wirt County.

In North Strabane Township, Washington County, SW Pennsylvania, Charles E. Young completed a test John Fulton Heirs in the Gordon sand, 2,375 ft., with an estimated showing of 40 bbl. a day. The oil was placed at 2,400-09 ft., total depth 2,431 ft.

The only new location listed for the week was Equitable Gas Co. No. 1 H. Walker, Kittanning Township, Armstrong County.

PERMIAN BASIN

New Jameson Field Gets Second Good Well

MIDLAND.—Sun Oil Co.'s second test in the new Jameson field of Coke County was coring and testing below 6,310 ft. A 60-minute drill-stem test in the Strawn limestone at 6,260-80 ft. put gas to the surface in 7 minutes. Oil started to flow in within 60 minutes and was allowed to flow for 1 minute before being shut in. Final recovery of oil from the drill pipe was 790 ft. of clean oil and 1,320 ft. of oil and gas-cut mud, estimated to contain 25 per cent oil. Flowing pressure ran as high as 1,175 lb., and shutin bottom-hole pressure rose to 2,700 lb. in 15 minutes. This test, the 1 Fred Jameson, is a ¼-mile south offset to the discovery. Sun has staked location for the 2 Fred Jameson, offsetting the discovery ½ mile to the south.

In Midland County, 15 miles southeast of Midland, Humble Oil & Refining Co. 1 Floyd, Section 16, Block 37, T&P Survey, ran a 70-minute drill-stem test at 9,475-9,510 ft. in lime and shale of Pennsylvanian age. An estimated 80,000 cu. ft. of gas came to the surface in 3 minutes. Recovery was 145 ft. of 41°-gravity oil, plus 450 ft. of oil and gas-cut mud. Operators were to core ahead to determine the extent of the pay section. Humble has filed application to start drilling at its 1 Hugh Dixon, 1,320 ft. north of the 1 Floyd.

New shallow oil production was apparently discovered in a core test by Gulf Oil Corp. in west Crockett County. Unconfirmed reports were that the basal Grayburg limestone, of the upper Permian, at 1,685 ft., headed and flowed 3 times in 5 hours before being stopped by the hole bridging. The oil, of 32°-gravity, was said to have flowed at the rate of 75 bbl. a day. It was expected that Gulf would run casing and apply to the Railroad Commission for a permit to complete the well as a discovery. Location is in Section 14, Block 29, University Lands Survey, and 6 miles southeast of the Clara Couch field, where 26°-gravity oil is produced from the Grayburg around 1,530 ft., and the San Andres around 2,222 ft. The core test was understood to have been started in an effort to get a better subsurface picture of the company's large block in that area before making location for a deep wildcat.

In western Andrews County, Stanolind Oil & Gas Co. has staked location for an east offset to Humble Oil & Refining Co. 2 Sims, Ellenburger discovery of the Freund area. The lone producer in the new field produces from pay topped at 10,466 ft. Stanolind's test, the 1 Celia A. McCrea, will be a rotary project to 10,900 ft.

In the new Andector (Ellenburger) area of Andrews County, Plymouth Oil Co. completed its 1-12 R. B. Cowden as the fifth well in the field. On production tests it flowed at the rate of 1,395 bbl. of oil a day from open hole at 8,437-8,350 ft., total depth. Gas-oil ratio was 455:1.

East extension of the Wheeler field from Winkler into western Ector County was in prospect last week at Phillips Petroleum Co. 1 Cushing. Perforated at 8,185-8,535 ft., in the Devonian, it swabbed small amounts of oil and some drilling mud and water. It was acidized and was swabbing oil load and acid residue, and developing a fair showing of gas.

WEST TEXAS SUCCESSFUL WILDCATS

Midland County: New field—Humble Oil & Refining Co. 1 Mary E. Turner, Sec. 43, Blk. 37, T2s, W. T. Holcombe Sur., 12 mi. SW Midland, pumped 139 bbl. 40.1°-gravity oil in 22 hr. and pumped off, Wolfcamp limestone 8,500-65 ft., TD 11,445 ft., PB 8,570 ft., elevation 2,701 ft.

WEST TEXAS WILDCAT FAILURES

Andrews County: Stanolind Oil & Gas 1 J. L. Young, Sec. 6, Blk. A-48, PSL Sur. 2 mi. W Fullerton field, dry, TD 9,105 ft., anhydrite 1,720 ft., Yates 2,850 ft., Glorietta 5,670 ft., Woodford shale 8,830 ft., Devonian 9,070 ft., elevation 3,314 ft.

El Paso County: A. R. Jones 1 Clem Sorley, Sec. 17, Blk. 5, PSL Sur., 25 mi. E El Paso, dry, TD 2,240 ft., pre-Cambrian approximately 2,200 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Devonian Oil Co. 1 Federal, 19-9s-38e, 20 miles northwest of the Landon field of Cochran County, Texas, but in northeastern Lea County, kicked off and flowed 147 bbl. of fluid in 24 hours. It tested 14 per cent basic sediment and water and the remainder oil. The well, which had been acidized several times but would not maintain a flow, kicked off when rods were being run to install a pump. During the second 24 hours it filled a 250-bbl. storage tank and was shut in. Flowing pressure was 1,200 lb. initially, which had dropped to 700 lb. at the end of the second flow period. Total depth is 5,012 ft. in the San Andres. Operators said the well was expected to make about 75 bbl. of oil a day.

In the Drinkard field, Lea County, Ohio Oil Co. 1-A Edith Butler was flowing better than 8 bbl. of 40.5°-gravity oil an hour from the lower Permian limestone. Operators are undecided on whether or not it is a southwest extension of this pay or a new producing area. The well kicked off on the swab after an 8,000-gal. acid treatment at 6,874-7,000 ft. Gas-oil ratio was 2,450:1 and the flow was through ⅝-in. tubing choke. The oil was cut with only 1 per cent sediment and acid water, with no formation water.

EASTERN TEXAS

Quitman Townsite Test Stirs Interest

DALLAS.—Bobby Manziel 1 Shamburger, Quitman townsite wildcat, held considerable interest last week when it was rumored that a stain of oil had been found, and tentatively called the sub-Clarksville between 4,600 and 4,700 ft. Operators were withholding official confirmation of the reports. At last report an electrical survey was run to check the pay possibilities between 4,710-4,507 ft., and operators were drilling ahead below 5,150 ft. Drilling contract calls for a depth of 5,700 ft., or 200 ft. into the Woodbine. Leases on townsite lots were said to have advanced from $50 to as high as $800 at the time the test started.

In Henderson County, Gulf Oil Corp. 1 Laco Oil Corp. Fee, was confident of production on the southwest flank of the Opelika field. The test was running 45 ft. high to the nearest producer, and with an elevation of 409 ft., topped the Massive at 8,320 ft. from drillers' samples. A core at 8,577-86 ft. in the Rodessa recovered hard, dense limestone, having some porosity. Location is 6,000 ft. west of nearest production in the field and contract calls for a test of the Pettit expected around 9,400 ft.

In Houston County, 6 miles southeast of Grapeland, Magnolia Petroleum Co. 1 J. W. Grounds was drilling below 6,377 ft. in shale and hard sand. It is scheduled to 10,300 ft. On an elevation of 398 ft., it logged the Austin at 5,805-6,132 ft., Woodbine at 6,175 ft., and a water-bearing sand at 6,177-90 ft. In the south-central part of the county, some 13 miles southwest of Rockett, Continental Oil Co. was coring below 7,812-37 ft. in chalk and shale, at its 1 Texas Long Leaf Lumber Co., an 11,000-ft. test.

Standard Oil Co. of Texas 1 New Birmingham, 2½ miles northwest of Maydell in Cherokee County, was said to be on the last of a series of tests in the Travis Peak before starting on the Rodessa, from which it was expected to make a gas-distillate well. The Travis Peak showed salt water from 9,626-10,017 ft.

EAST TEXAS WILDCAT FAILURE

Collin County: Standard Oil Co. of Texas 1 T. W. Newsome, John W. Cos Sur., A-159, ¾ mi. NE Frisco, dry, TD 8,260 ft., Goodland limestone 1,460 ft., sand with slight show of oil 4,851-61 ft., hard tight oil-stained sand 6,762-77 ft., Arbuckle 7,470 ft., hard dolomite 8,251-61 ft., elevation 763 ft.

SOUTHWEST TEXAS

New Pay Discoveries Found in Two Fields

CORPUS CHRISTI.—A new pay zone for the Alta Mesa field in Brooks County has been opened by the Standard Oil Co. of Texas 32 Mestena Oil & Gas Co., lease 1, at the 4,965-70 ft. level and operators now are preparing to attempt a dual-completion in the 4,500-ft. sand for another new pay discovery. The flow was 127 bbl. of clean oil per day through a ½-in. top choke and ⅜-in. bottom choke, with 650 lb. to 750 lb. tubing pressure and gas-oil ratio 565, from the 4,965-70 ft. perforations, in sand topped at 4,958 ft. The 4,500-ft. zone had indicated production in a drill-stem test at 4,515-18 ft., which recovered 750 ft. of clean oil, 44.9°-gravity, in 10 minutes, with 58 lb. working pressure, bottom-hole pressure 1,040-1,900 lb. Total depth is 6,851 ft., with 5½-in. casing at 5,012 ft.

Atlantic Refining Co. 1 Mrs. J. R. Parr, at North Minnie Bock field, Nueces County, flowed 90 bbl. of oil per day with 2 per cent basic sediment and water on a 16-hour drill-stem test with 1,600 lb. working pressure through perforations at 7,680-89 ft. to indicate an apparent new oil pay zone discovery for that field. Test at 5,498-5,504 ft. failed.

John F. Camp & Sons 1 John F. Camp Fee, prospective new oil discovery in Medina County, 3½ miles southeast of Devine, is shut down waiting on pumping unit to continue testing after swabbing oil from sand at 2,240-50 ft. Drill-stem test at this level recovered 20 ft. of mud and oil in 20 minutes, and casing was set for completion.

There were 22 new locations reported this week, 5 being wildcats, 2 in Willacy and 1 each in Cameron, Jim Hogg and Starr counties. The 27 completions included 12 oil, 4 gas, and 11 dry with 6 of the dry holes being wildcats, 2 in McMullen and 1 each in Caldwell, Hidalgo, Starr and Webb counties.

SOUTH TEXAS WILDCAT FAILURES

Caldwell County: C. W. Voyles 1 Euphemia Thomas, in Jeremiah Roberts survey, 3 mi. NE of Lockhart, dry, TD 2,141 ft. in Edwards lime.

Hidalgo County: Ernest Cockrell, Jr. 1 Lloyd M. Bentsen et al, Porcion 50, 7 mi. SW of Mission, dry, TD 8,505 ft.

McMullen County: W. W. Hawkins 1 Nueces Land & Livestock Co., John T. Morehead survey 235, 5 mi. N of Munson field, dry, TD 1,802 ft.

McMullen County: Harry Ezzell, Agt. 3-A

Harry Ezzell, Agt., in Sec. 39, Hays Ezzell subd. in H. M. Brewer sur. 7, 1 mi. SW of Ezzell field, dry, TD 1,995 ft.

Starr County: Dan Auld & Ray Boyd 1 Ramos Heirs, in Survey 149, dry, TD 1,330 ft., in Pettus sand.

Webb County: Gravis & Mitchell 1 A. M. Bruni est., Blk. 167, O. W. Killam subd. of El Ranchito tr., in Jose Borrego grant, 11 mi. S of Mirando City, dry, TD 3,003 ft.

TEXAS GULF COAST

New Field in Prospect In Liberty County

HOUSTON.—A prospective new gas pool opener in the Sandune area of Liberty County, Humble Oil & Refining Co. 1 John Tarlton, in Alexander Taylor survey, 5 miles west of Hull field, is flowing gas and mud while cleaning through perforations at 9,399-9,407 ft. Total depth is 10,036 ft., and 5½-in. casing cemented at 10,004 ft.

J. H. Snowden et al completed a good oil well on the southeast side of Caplen field production in Galveston County. It is the 3 Leslie Simpton Estate in the McKinney-Williams survey, which was completed for a potential gage of 159 bbl. of 32°-gravity oil daily through a ½-in. choke with 900 lb. flowing pressure on the tubing, gas ratio 570. Production is through perforations at 6,180-91 ft., total depth is 6,612 ft.

The Olive field of Hardin County is being extended to the north by Pan American Production Co. 1-B Olive Sternenberg Lumber Co., located in the G. Dorsey survey. Test jetted 182 bbl. of wash water and 2 per cent oil while cleaning. Well continues to jet and swab for completion through perforations at 9,702-30 ft., 9,742-52 ft., and 9,762-67 ft.

Mackhank Petroleum Co. 2 J. M. Freeland, outpost test at Cosden-Wilcox field, in Bee County, apparently extending the oil production in this field about ⅝ mile northward, is flowing pipe-line oil with no gage, through perforations at 7,065-78 ft., in the discovery oil pay (Slick zone). Total depth is 7,376 ft., and well is located in the John Pace survey.

The Texas Co. 2 Bender Estate, in T. W. Marshall survey, seeking deep production in the Humble pool of Harris County, was drilling below 13,630 ft. in hard sandy shale at last report.

Amerada Petroleum Corp. et al 2 W. T. Morrison et al, second test for the East Blessing discovery area of Matagorda County, has been completed as a dry hole at total depth of 10,195 ft. Sand record showed sands from 8,834-44 ft. which had odors of oil and gas with another from 9,983-10,012 ft. Tests in the upper sands failed to flow, and swabbed with a recovery of salt water, and a slight show of oil. Several tests in the lower sands showed salt water with slight show of oil. A test of the bottom of the hole from 10,047-189 ft. flowed a small amount of gas and died, tool recovery being 15 stands of salt water with slight traces of oil and gas. Several other tests were made at various depths, all of which failed to indicate commercial production.

A total of 34 locations were reported this week with 6 being wildcats, 2 in Victoria and 1 each in Bee, Chambers, Karnes and Live Oak counties. The completions include 16 oil, 2 gas and 6 dry with 3 of the dry holes being wildcats, 2 in Fort Bend and 1 in Matagorda County.

TEXAS GULF COAST WILDCAT FAILURES

Fort Bend County: General Crude Oil Co. 1 Cora Slavin et al, in H. Chriesman sur., ¼ mi. SW of Thompson townsite, dry, TD 8,508 ft.

Fort Bend County: Harold Link & W. L. Goldston 1 R. F. Ransom, in Jos. Kuykendall sur., 3 mi. SE of Richmond, dry, TD 8,184 ft.

Matagorda County: Skelly Oil Co. 1 Albert F. Gest, in H. Gosling survey, 1½ mi. SE of East Bay City production, dry, TD 12,051 ft.

CANADIAN FIELDS

Activity Increases In New Field

CHATHAM. — In the Central Alberta plains area south of Edmonton, Imperial-Leduc 1, LSD 5, 22-50-26w4, finished in Devonian limestone at 5,006 ft. and showed a flush of 40 bbl. an hour on its initial test which did not run a full 24-hour period. Walker Taylor, western production manager for Imperial Oil, stated that the well produced 424 bbl. under a controlled flow in a 24-hour period, which might have been higher if transportation facilities or additional storage had been available. The company had two 500-bbl. tanks on the site. Tests are being made to determine the most efficient rate of flow, and following these the well may be acidized. Production is around 38.4° gravity. (See The Oil and Gas Journal, Feb. 22, 1947, p. 191.)

Imperial-Leduc 2, LSD 1, 16-50-26w4, is deepening after running surface pipe to 248 ft. Imperial-Leduc 3 will be drilled on the southwestern outskirts of Edmonton, north and east of the discovery. The company has added 600,000 acres to its hold-

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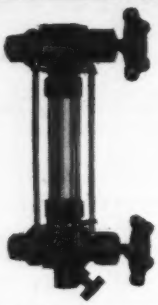

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ings in the Edmonton-Leduc area, making a total of around 2,000,000 acres.

Wabumun Lake.—In the Wabumun Lake area 68 miles west of Edmonton, Anglo-Canadian Oil Co. of Calgary will undertake a core drilling program in March or earlier. The company has holdings of 177,000 acres in addition to a 140,000-acre reservation east of Edson.

California-Standard.—Operations of California-Standard Oil, which have already contributed to developing the Taber, Conrad and Steveville-Princess fields in southern Alberta, will be this year extended to the central plains area. New holdings taken by the company for early development include a 142,000-acre reservation in townships 44-47, ranges 1 to 5w4, extending from the Wainwright field east to the Saskatchewan boundary. The company will also test a block of 160,000 acres in townships 36-39, ranges 13 to 17w4 between Castor and Gadsby.

CALIFORNIA

Trico Gas Field West Flank Extended

LOS ANGELES.—Lebow and McNee's 1 McDonald completion on the west flank of the Trico gas field in 19-24s-23e, Tulare County, has extended production about 1,100 ft. The well flowed 7,000,000 cu. ft. on a 2-hour test through a ½-in. choke with 800 psi. flowing pressure. The lower Atwell Island zone, productive in the northwest extension of the field, was wet in this well so completion was made in the higher First Mya zone between 2,455 and 2,500 ft. Along with the water, however, the well produced about 1,500,000 cu. ft. of gas from the lower Atwell Island so further prospecting to this zone is contemplated. The operators' McDonald lease embraces about 400 acres, and a second well will probably be drilled about ½ mile south of No. 1. This is probably all the development work that can be done in the Mya in view of the 160-acre spacing pattern. On a line with the northwest trend of the field, and about 1 mile from production, Pacific Western Oil Corp. will drill 1 Taylor, an extension in 36-23s-22e. The location is 3 miles west of the town of Alpaugh.

Middle Dome Corp.'s 73-30V, new deep sand discovery well on Kettleman Hills Middle Dome, is cutting 38 per cent salt water, although production was originally as high as 2,000 bbl. per day of clean 39° oil through a 42/64-in. choke a week ago. Latest gage is 430 bbl. gross and 350,000 ft. of gas through 22/64-in. choke with 400 psi. tubing pressure. Standard of California, which has a 75 per cent interest in the well and is the operator, is endeavoring to locate the point of water intrusion. A complication is 1,400 ft. of drill pipe fish in the bottom of the hole.

A good well is occasionally brought in from the schist in the Edison field, although the peak of schist development has long since passed. Last week, Harry H. Magee, operator, completed 9 Dougherty on the north flank of the field in 14-30s-29e flowing 1,887 bbl. of 19.5° clean oil through a ½-in. choke. Bottomed at 2,606 ft., the well was drilled 110 ft. into the schist. The completion proves up several locations. Meanwhile, Oceanic Oil Co. found the schist wet in its 2 Osborne on the west side of the field in 15-30s-29e and abandonment followed at 3,787 ft.

Production from the Temblor pool in the Salt Creek-Cymric area was extended ¼ mile south when Miller and York completed 1 Anderson in 20-29s-21e flowing 550 bbl. of 20° gravity clean oil through a 10/64-in. choke. The well was drilled and abandoned early last year, but a recent survey resulted in its being redrilled into the pay.

Thirty-one feet of Vedder oil sand has been cored in 1 Alma, a wildcat being drilled by Morton and Kohlbush west of the Round Mountain field in 15-28s-28e. Pipe has been cemented at 2,730 ft. with top of the Vedder located at 2,715 ft. Upper part of the Vedder was reported silty with the bottom 5 ft. well saturated.

CALIFORNIA WILDCAT FAILURES

Kern County, Comanche Point area: Albert Angus 1 Tejon, 19-32s-30e, dry, TD 534 ft.
Jasmine area: Harp and Brown 1 Quinn, 11-25s-27e, dry, TD 2,347 ft.
Cymric area: Rothschild-Bender Oil Operations 4 Anderson, 20-29s-21e, dry, TD 5,277 ft.
Mount Poso area: Elmer C. von Glahn 1 Hooper, 36-26s-27e, dry, TD 2,416 ft.
Los Angeles County, Newhall area: Seaboard Oil Co. 8-1 Mission Land, 25-3n-16w, dry, TD 9,528 ft.
Santa Barbara County, Lompoc area: Union Oil Co. 46 Purisima, 14-7n-34w, dry, TD 3,549 ft.

MICHIGAN

New Oil Field Indicated In Newaygo County

SAGINAW.—Sun Oil Co. is testing a Newaygo County wildcat viewed as the possible indicator of a new Michigan oil field. Reported to have flowed 250 bbl. a day, the well is the 1 Linderer in Section 11, Garfield Township. The location is 12 miles southwest of Newaygo's once prolific Goodwell field, and near a small discovery reported last fall in Claybanks Township.

Field operations for the week in Michigan resulted in nine completions, but only three new locations were announced, one each in Kent, Isabella and Montcalm counties. Best of the five producers was Ohio

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Oil Co. 1 Moyses-Kenney in Cato Township, Montcalm County, which pumped 140 bbl. on 12-hour test after acidizing. In Algoma, Kent, a Socony-Vacuum completion flowed 124 bbl. pinched after acid. Gordon Oil Co. 2 Keef in Clayton field, Arenac County, pumped 107 bbl. in 18 hours, after acidizing. Two minor producers were completed in Walker Township, Kent County. Three of the four dry holes were wildcats.

MICHIGAN WILDCAT FAILURES

Allegan County, Casco Township: J. E. Hood 1 Orville J. Compton, SE SE SW 7-1n-16w; dry in Traverse limestone; TD 1,201 ft.

Arenac County, Arenac Township: J. E. Bauer 1 Kazimier Jurek, NW SW SE 19-19n-5e, dry in Dundee, TD 2,973 ft.

Wayne County, Northville Township: Union Drilling & Producing Co. 1 Glen Angell, SE NE NW 7-1s-8e, dry, TD 4,288 ft.

SOUTH LOUISIANA

New Gas Pay Opened In Welsh Dome Area

NEW ORLEANS.—New gas production on the northwest flank of the Welsh dome in Jefferson Davis Parish has been opened by Stanolind Oil & Gas Co. 1 T. S. Stegal, 21-9s-5w. Drilled to a total depth of 8,233 ft., operators plugged back to 6,856 ft., and on an initial test through perforations at 6,853-55 ft. the well flowed a small amount of gas. Additional holes were shot from 6,843-53 ft. and it was completed as a dry gasser, no gage.

Production in the Mamou field, Evangeline Parish, has been extended ½ mile southwest by Magnolia Petroleum Co. 1 Ophelia Ledoux, NW NW 7-5s-1e. On initial test through perforations at 11,566-570 ft., flowed 70 bbl. of oil along with 83 bbl. of water through a 6/64-in. choke on a drill-stem test using 6/64-in. and ¼-in. chokes. Flowing pressure was 3,100 lb. and gas-oil ratio of 6,030, gaging 444,000 cu. ft. of gas. Gravity of oil 47.2°. Perforations have been squeezed for another test. Total depth of the hole is 11,625 ft. and 7-in. pipe cemented on bottom.

Magnolia 45 Cameron Meadow Land Co., 28-14s-13w, on potential test, flowed 67 bbl. of condensate daily through a 7/64-in. choke with 3,200 lb. flowing pressure on the tubing and a gas ratio of 10,141. Production is through perforations in the new deep producing zone at 8,886-96 ft.

Magnolia 1-C Lutcher, wildcat test 4 miles northeast of Mud Lake gas and condensate production in Cameron Parish, 24-14s-11E, is making an initial production test. Total depth is 11,705 ft., with 7-in. casing at 11,012 ft. and 5-in. liner from 10,855-11,705 ft. A squeeze job was performed at 11,550-552 ft. after which gamma ray was run and pipe reperforated with 71 shots from 11,639-659 ft. where a drill-stem test is being run. The hole is credited with numerous sands showing gas and condensate from the 9,000-ft. to 11,000-ft. levels.

Sixteen new locations were reported for South Louisiana this week, 2 being wildcats, 1 each in Plaquemines and St. Landry parishes. Twelve oil wells were completed and 1 dry hole. One wildcat completion opened the new Holmwood oil pool in Calcasieu Parish. Iberville Parish received the greatest activity with 4 completions, Cameron received 3 and Beauregard and Terrebonne each received 2.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Calcasieu Parish: New Oil Pool, Holmwood-Sohio Pet. Co. 2 Farmers Land & Canal Co., 26-10s-7w, 1½ mi. N of Holmwood townsite, and 5 mi. SW of Bon Air field, TD 11,250 ft., perf. 10,354-362 ft., oil sand 11,350-370 ft., IP 292 bbl. per day through a 5/32-in. choke, gas-oil ratio 676, TP 1,850 lb., gravity 37.5°, no water.

OHIO, KENTUCKY

Bearfield Pool Gets East Extension

COLUMBUS.—The Bearfield pool in Perry County was widened ¾ mile to the east by the F. R. Beasley 1 Jesse J. Ketcham 1, Sec. 27, Bearfield Township. The well was tubed in the Clinton sand for 1,200,000 cu. ft. with a rock pressure of 1,125 psi. The sand was logged at 3,956-94 ft. In Madison Township, Perry County, B. G. Bartley drilled in a good well on Ethel Hoover, Sec. 23. Clinton sand, reached at 3,330 ft., had shows of both oil and gas, and after shot flowed 77 bbl. with an estimated 500,000 cu. ft. gas. In Sec. 33, Madison Township, John Morrow 3 Anna Beard flowed 60 bbl. and swabbed 40 bbl. after shot.

The North La Grange pool was extended nearly ½ mile to the southwest by the Ohio Fuel 1 B. M. Aldrich, Lot 45, La Grange Township, Lorain County. Clinton sand at 2,344-49 ft. gaged 798,000 cu. ft. natural. The company moved the machine ½ mile farther west to drill another well.

The Frazier pool in northern Brush Creek Township, Muskingum County, had a ½-mile west extension by the Salem Petroleum Prod. Co. on Hattie D. Stockdale, Sec. 15. Clinton was topped at 3,740 ft. and the well flowed at the rate of 681,000 cu. ft. from 3,780 ft.

New locations were down to 10 for the week, with 4 in Stark County, 2 in Muskingum County and the other 4 scattered. Completions were also down to 16. Stewart, Lancaster, and Brush Creek fields each completed 3, followed by Sandyville, Mt. Vernon and Ashland with 2 each and Cambridge 1.

WILDCAT FAILURES COMPLETED IN OHIO

Coshocton County, Perry Township: Ohio Fuel Gas 1 Ethel Crowthers, Sec. 9, Clinton 3,085-3,145 ft., TD 3,169 ft.

EASTERN KENTUCKY

ASHLAND.—The report of activities in the Eastern Kentucky field during the week listed no completions, but showed several locations, on the Matilda Clark property, Pike; Wiley Tolliver, Knott; William Hyden, Johnson; Grover Runyon, Pike; M. M. Collins, Magoffin, and J. W. Maynard, Pike

Kentucky-W. Va. Gas Co. was testing for gas on the David Newsom property in Pike County, at a depth of 3,506 ft. and also on the Green Patrick property, Magoffin County, at 2,669 ft.

WESTERN KENTUCKY

OWENSBORO.—Pure Oil Co. and Stanolind Oil & Gas 1 G. Hammons, 2-H-67, a rank wildcat in Clay County, is running pipe to 3,475 ft. to test an oil show in the Knox Dolomite topped at 3,440 ft. Well was drilled to 3,640 ft. TD and plugged back to 3,514 ft.

WESTERN KENTUCKY WILDCAT FAILURES

Daviess County: W. E. Hupp et al & Ryan Oil 1 L. R. Waitman, 6-P-29, elev. 382 ft., dry, TD 1,804 ft., Tar Springs 1,196-1,238 ft., Paint Creek 1,525-30 ft., Ste. Genevieve 1,652 ft.

Henderson County: John Buckman 1 Dickey, 2-O-22, dry, TD 2,810 ft., Tar Springs 1,917-2,014 ft., Cypress 2,274-2,311 ft., Ste. Genevieve 2,608 ft., and McClosky 2,693-2,704 ft.

INDIANA

EVANSVILLE.—One producer and 1 dry hole in Knox County and 1 producer and 1 dry hole in Posey County account for the state's total of 4 completions for the current week. In the Princeton pool, where production is found in 3 different zones, there are 16 active operations.

INDIANA WILDCAT FAILURES

Knox County: A. J. Slagter, Jr., 1 Yockum, NE 9-2n-10w, dry, TD about 1,900 ft. through McClosky.

N. CENTRAL TEXAS

New Strawn Producticon For Coleman County

WICHITA FALLS.—Anzac Oil Corp. et al 1 C. V. Evans, 3 miles southwest of Valera, in Coleman County, opened new production in Fry sand of the Strawn at 2,930-33 ft., total depth, when it headed and flowed 75 bbl. of 43°-gravity oil in 17 hours. Casing was set at 2,887 ft., shutting off an estimated 10,000,000 cu. ft. of gas encountered at 2,853-83 ft. Production tests had not been made on last report, but the well was still heading about once an hour. Initially, it was heading at intervals of 6 minutes. Derrick floor elevation is 1,972½ ft. Nearest production is the Valera-Overall area, some 6 miles to the east, which also has production in the Fry sand.

Fred M. Manning, Inc., 1 James R. Record, Throckmorton County Mississippian limestone discovery, 5 miles northwest of Woodson, flowed 220 bbl. of oil in 20 hours on its first production test after cleaning itself. Flow was through 12/64-in. tubing choke, with tubing pressure of 500 lb., and casing pressure of 600 lb. Testing was continuing from the pay zone at 4,673-93 ft. Meanwhile, the same operators' 1 R. A. Brown Cattle Co., Section 919, TE&L Survey, about ½ mile northeast of the discovery, was getting under way for an offset test.

Late wildcat drilling reports included: Denver Producing & Refining Co. 1 Rich, I&GN Survey in northern Grayson County, which was drilling below 12,432 ft. in the Simpson. This test is North Texas' deepest, according to reports. Humble Oil & Refining Co. 1 Wester, 3 miles south of Weston in Collin County, was drilling below 5,524 ft. in black shale and lime streaks, with no shows reported. The Texas Co. 1 Williams, Denton County wildcat northeast of Denton, reported a recovery of 10 ft. of mud on a drill-stem test at 1,891-1,909 ft. in a limestone section which had shown some oil. Operators were drilling ahead. In northwestern Montague County, J. W. Clanton Survey, Continental Oil Co. 1 Moss was below 4,848 ft. in shale, with no shows reported. It is scheduled to 7,500 ft.

NORTH CENTRAL TEXAS SUCCESSFUL WILDCATS

Archer County: Extension, L. T. Burns 1 R. O. Andrews, Sec. 1,806, TE&L Sur., 6 mi. SE Anarene, flowed 80 bbl. 42°-gravity oil in 8 hr., 15/64-in choke, potential 240 bbl., casing pressure 290 lb., tubing pressure 160 lb., GOR 650:1, Caddo limestone 4,454-68 ft., TD 5,245 ft.

R. C. Dublin et al 25 R. Campbell estate, Sec. 1,382, TE&L Sur., 5 mi. S Anarene, pumped 20.9 bbl. 38°-gravity oil, Gunsite limestone 956-60 ft., TD 992 ft.

NORTH CENTRAL TEXAS WILDCAT FAILURES

Archer County: John F. O'Donohoe 1 L. W. McCrory, Blk. 107, ATNCL Sur., 7 mi. N Archer City, dry, TD 1,560 ft. in sand.

Jack L. Story 1 C. L. Abercrombie, Blk. 153, Harris Subd., 3 mi. SW Archer City, dry, TD 1,222 ft. in shale.

Cooke County: Hollandsworth Drilling Co. 1 N. H. Finley, M. Langham Sur., 3½ mi. S Myra, dry, TD 1,061 ft. in shale and sand.

Jack County: Continental Oil Co. 1 E. J.

Shawver, Lot 43, Blk. 1, Henderson County School Land, 3½ mi. NW Gibtown, dry, TD 5,218 ft. in limestone, no tops reported.

S. D. Johnson 1 D. Lindsey, I. N. Wright Sur., A-898, 11 mi. N. Jacksboro, dry, TD 3,415 ft.

WEST CENTRAL TEXAS WILDCAT FAILURES

Haskell County: Thomas D. Humphrey 1 G. N. Bascomb, T. D. Owings Sur. 111, 2½ mi. SE Haskell, dry, TD 4,493 ft., limestone 4,070 ft., no shows.

Taylor County: J. W. Sorrels 1 B. S. Dance, Jose Gabo Sur. 128, 3 mi. NW Tye, dry, TD 3,410 ft., Dotham limestone 2,008 ft., Flippen sand 2,395-2,403 ft., limestone 2,405 ft., elevation 1,779 ft.

MISSISSIPPI

New Oil Pay Probable In LaGrange Field

JACKSON.—A second pay zone, in the Wilcox, for the LaGrange field of Adams County, was indicated last week at Texas Pacific Coal & Oil Co. 2 O. L. Wilson, Section 8-6n-2w. A 10-minute drill-stem test was made at 4,625-38 ft. which put gas to the surface in 1 minute, and made a final recovery of 30 ft. of oil and 10 ft. of oil-cut mud. The section was cored to 4,641 ft. and the second test was said to have filled the drill pipe in 10 minutes. Total recovery on the latter test was not announced. The oil tested 41.4°-gravity. Operators were coring ahead to determine the extent of the section. Regular pay for the field is the second Wilcox, around 6,200 ft.

MISSISSIPPI WILDCAT FAILURE

Chickasaw County: Pan American Production 1 H. B. Carter, NW SE SW 24-12s-4e, dry, TD 2,642 ft. in sand with asphalt spots.

FLORIDA WILDCAT FAILURE

Alachua County: Tide Water Associated Oil Co. 1 R. H. Cato, C SE SW 23-8s-18e, ..., dry, TD 3,146 ft., no tops reported.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that sealed bids will be received until 1 p.m. Wednesday, March 19, 1947, for land described herein situated within the known geologic structure of the Compton field, N.M.P.M., New Mexico. This land is offered to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the land under Section 17 of the leasing act of February 25, 1920 (41 Stat. 437, 30 U.S.C. sec. 181), as amended, as follows: T. 18 S., R. 27 E., sec. 5, W½SE¼, 80 acres. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil, and 12½ per cent to 16⅔ per cent for gas, in accordance with Schedule B in the lease form. Each bidder must submit with the bid one fifth of the amount bid in cash, or by certified check on a solvent bank, or by money order, made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease, required under 43 CFR 192.42(b) and (c). The envelopes should be plainly marked, "Bid for lease, Compton field, New Mexico. Not to be opened before 1 p.m., March 19, 1947." No bids received after the hour fixed herein for submitting bids will be considered. The remainder of the bonus and the annual rental at the rate of $1 per acre must be paid and a corporate surety bond in the sum of at least double the amount of rental, but in no case less than $1,000 nor more than $5,000, must be furnished by the successful bidder prior to the issuance of a lease. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Fred W. Johnson, Acting Director.

OKLAHOMA

Stephens County Tests In Limelight

COLINE OIL CO., 1 Cooper, SE NW SE 1-2n-8w, a Stephens County wildcat, flowed 40° oil by heads from a Pennsylvanian sand through perforations at 9,015-40 ft., averaging 15 bbl. per hour through 2½-in. tubing. This well, originally drilled to 12,159 ft., set 7-in. casing at 11,390 ft. and plugged back. First perforations were at 11,270-345 ft.

The new test is ¼ mile south and one location west of an old well, now abandoned, which produced for a while and was known as the Coline pool. The original well, Coline 1 Johnson, SW SE NE 1-2n-8w, was worked over several years ago and finally abandoned. It originally produced from a pay at 8,997 ft. Both these wells lie about 3½ miles northeast of the West Marlow pool.

Texas Co. 1 Denny, NE NE NE 1-2s-4w, a wildcat in Stephens County, east of the Alma pool and north of Milroy, found saturated sand at 6,802 ft., and on a drill-stem test from 6,800-21 ft., recovered 30 ft. of oil and 120 ft. of oil-cut mud. Later a core from 6,838-56 ft. showed additional saturation and preparations are being made for a drill-stem test of this interval.

Amerada Petroleum Corp. 1 Jacobs, SW SE NE 13-1s-6w, northwest of the West Velma pool in Stephens County, which had a favorable drill-stem test last week, was completed flowing 329 bbl. of 42.5° oil in 24 hours through ⅜-in. and ¾-in. tubing chokes from perforations at 2,962-95 ft. Casing pressure was 660 psi., tubing pressure 200 psi. gas-oil ratio 263 cu. ft. The well was drilled to 4,968 ft. total depth, plugged back to 3,710 ft., and 5½-in. casing set at 3,610 ft.

The Meno pool opener, R. Olsen Oil Co. et al 1 Ott, C W½ SW SE 4-21n-9w, Major County, showed increasing amounts of distillate when opened to test through gas separator. The well which originally showed only gas, and later showed a spray of distillate, made 11 bbl. distillate the first hour and 14 bbl. the second hour on a 2-hour test. The distillate deepened in color during the test. Production is from the Wilcox at 8,015-8,124 ft.

The Mid-Continent 3 Campbell NW SE NE 33-7n-4w, an abandoned Wilcox producer in the middle of the old Crescent pool, which is being deepened to the Arbuckle, has found a new sand below the Wilcox. Sand encountered at 6,504 ft. showed an estimated volume of 5,000,000 cu. ft. of gas per day. The first Wilcox was reported at 5,996 ft. and the second Wilcox at 6,134 ft.

Hughes County appears to have another pool opener in F. A. Gillespie & Sons 1 Meadors, NW NW SW 31-8n-9e, which had the Booch at 2,780 ft. After a 40-qt. shot at 2,790-2,812 ft., the well swabbed 75 to 100 bbl. of oil per day.

O. H. Grimes 1 Crawford, SE SE SW 30-9n-11e, the fourth producer in the new Wetumka Southeast pool, is being put on pump, after making 94 bbl. and 85 bbl. of oil on successive 24-hour tests.

Exploratory work in Oklahoma has reached the highest level in recent years. For the current week, there are 95 new locations, 18 of which are wildcats. While shallow tests in Cotton County account for a considerable number of the total operations, there is also a high level of activity in the areas of deeper drilling, Garvin County alone having 24 wells drilling or in various stages of testing below 5,000 ft., and McClain County has 15 wells below 5,000 ft.

OKLAHOMA SUCCESSFUL WILDCATS

Noble County: C. C. Harwell 1 Greer, SW SW SW 24-23n-1w, flowed 185 bbl. of 43.5°-gravity oil per day from Bartlesville at 4,370-95 ft. through a 3/16-in. tubing choke, Layton 3,424 ft., Layton sand 3,432 ft., Oswego 3,905 ft., TD 4,395 ft.

OKLAHOMA WILDCAT FAILURES

Choctaw County: E. L. Johnson 1 Knight, NW NW NE 26-7s-15e, dry, TD 649 ft., no tops reported.

Cimarron County: Stanolind Oil & Gas Co. 1 Rolla Lathrop, C NW SE 11-3n-8ecm, dry, TD 5,100 ft., Base Cimarron 1,645 ft., Keyes zone 4,819-31 ft., Mississippian 4,831 ft., St. Genevieve 5,018 ft.

Comanche County: Frank Woods 1 Morris, SE SE NE 2-1s-11w, dry, TD 2,504 ft., conglomerate 1,060-80 ft.

Cotton County: R. E. Bullington et al 1 Scherler, SE SE NW, dry, TD 2,200 ft., no tops reported.

Kingwood Oil 1 Gandy, SW SE SW 28-2s-11w, dry, TD 1,905 ft., sand 1,858-74 ft.

Jess Harris et al 1 Scruggs, SW SE SE 22-3s-13w, dry, TD 2,367 ft., no tops reported.

A. P. Carr 1 Hooker, SW NW SW 12-3s-12w, dry, TD 1,623 ft., no tops reported.

Akin & Dimock 1 Wolfe, NE NW SE 21-3s-11w, dry, TD 2,015 ft., sand 1,115-19 ft. and 1,224-32 ft., conglomerate 1,289-1,307 ft., saturated sand 1,476-80 ft., Megargle lime 2,007-15 ft.

Hedrick-Howell 2 Brinlee, NW NW NW NW 13-4s-11w, dry, TD 1,505 ft., sand 730-40 ft., lime 1,148-1,237 ft., sand 1,298-1,303 ft.

Paul Fleeger 1 F. D. O'Neal, NE NE NW 34-5s-12w, dry, TD 2,260 ft., sand 1,000-07 ft., 1,062-72 ft., lime 1,550-69 ft., sand 1,798-1,801 ft.

M. P. McLaughlin, 1 Suddeta, NW NW NW 1-5s-11w, dry, TD 2,205 ft., no tops reported.

Jackson County: G. L. Tatums 1 Vestal, SE SE SE 25-3n-21w, dry, TD 3,205 ft., no tops reported.

Kingfisher County: Atlantic Refining Co. 1 Vilhauer, SW NE NW 22-18n-9w, dry, TD 9,640 ft., Layton 6,205 ft., Oswego 6,885 ft., Prue 7,110 ft., Pennsylvanian lime 7,493-7,512 ft. and 7,470 ft., Mississippian 8,028 ft., Woodford 8,615 ft., Hunton 8,643 ft., Sylvan 9,070 ft., Viola 9,170 ft., dense 9,245 ft., Wilcox 9,385 ft., 2nd Wilcox 9,455 ft., lime 9,580-9,610 ft., sand 9,610-40 ft.

Okfuskee County: Smith-Horton Drilling Co. 1 Weldon, SW SW NE 17-12n-9e, dry, TD 4,047 ft., Oswego 1,810 ft., Calvin 1,815 ft., Inola 2,775 ft., Bartlesville 2,785 ft., Booch 3,148-90 ft. with no show, Gilcrease 3,315 ft., Union Valley 3,488-3,510 ft., Mayes 3,790 ft., Woodford 3,990 ft., Hunton 4,013 ft.

Oklahoma County: Sunray Oil Corp. & Double R Drilling Co. 1 Cole, NE NE SW 2-13n-1e, dry, TD 5,806 ft., Hogshooter 3,970 ft., Checkerboard 4,270 ft., Oswego 4,862 ft., Bartlesville 5,199 ft., Mississippian 5,338 ft., Woodford 5,380 ft., Hunton 5,472 ft., Sylvan 5,488 ft., Viola 5,591 ft., 1st Wilcox 5,692 ft., 2nd Wilcox 5,768 ft.

Pontotoc County: W. A. Delaney 1 A. Perry, SW SW SW 17-4n-7e, dry, TD 2,090 ft., Calvin 575 ft., Senora 820 ft., Gilcrease 1,570 ft., Wapanucka 1,920 ft., Union Valley 2,010 ft.

Seminole County: Norbla Oil Co. 1 Reed, NW NE NE 2-5n-7e, dry, TD 3,031 ft., Calvin 950 ft., Senora 1,380 ft., brown lime 2,360 ft., Gilcrease 2,640 ft., Wapanucka 2,760 ft., Cromwell 2,900 ft.

Stephens County: B. T. D. Oil Co. 1 Land Bank, SE N ESE 15-1n-6w, dry, TD 2,522 ft., no tops reported.

Tillman County: J. S. Batson 1 Parker, SW SW SW 11-2s-16w, dry, TD 1,970 ft., no tops reported.

Consolidated Oil 1 Stack, NE NE NE SW 17-4s-15w, dry, TD 2,667 ft., Granite Wash 1,618 ft., lime 2,145 ft., sand 2,185-2,203 ft., lime 2,248 ft., Breckenridge 2,367 ft., Megargel 2,522 ft.

Danciger Refining Co. 1 Bear, NE NE SE 18-4s-15w, dry, TD 2,553 ft., Breckenridge 2,272 ft., sand 2,476 ft.

W. G. Gouchie 1 Wilson, NE SE NE 18-1n-18w, dry, TD 1,124 ft., sand 1,050-63 ft. and 1,663-67 ft.

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ROCKY MOUNTAIN

Another Tensleep Pool Opened

DENVER.—Superior Oil Co. definitely has a discovery in the Tensleep horizon on the Herrick Dome, Albany County, Wyoming, in its 1 Herrick SW NW SE 1-16n-76w, at around 3,600 ft. A pumping test will be made in about 2 days when official information will be released as to total depth, top of sand, and initial production. Location is 10 miles southeast of the Quealy Dome, where California Co. recently completed a discovery in an old well deepened from upper producing horizons. Seven dry holes have been drilled within 3 miles of the discovery in past years, one only ¼ mile away, and again it is emphasized that modern geophysical methods of locating structures, and deeper drilling hold out potentialities for prospecting not apparent in the earlier days of wildcatting.

Neiber Dome.—G. & G. Drilling Co. 1 Government NE NW 19-45n-92w, a discovery in the Embar through perforations at 10,025-55 and 10,070-95 ft., which flowed 281 bbl. of oil in 9 hours through ¾-in. choke, has not yet made a 24-hour test due to expanding gas freezing up the tubing. First test was made by circulating hot oil between the tubing and casing by using 3,000 ft. of 5-in. liner, but this permitted only a short test. A special string of tubing which has been coated with an insulating material will be run in an attempt to overcome the difficulty.

Steamboat Butte.—Brinkerhoff Drilling Co.-Sohio Petroleum Co. 1 Tribal NW NW NW 9-3n-1w, a 1 mile southeast extension at Steamboat Butte, Fremont County, Wyoming, is running higher on all formations than expected. It had the top of the Nuggett at 5,310 ft. and a drill-stem test at 5,315-34 ft. recovered 1,500 ft. of oil in 1 hour. It recovered 620 ft. of 42° green oil in the Dakota in a drill-stem test at 4,455-61½ ft. in one hour.

Church Buttes wells.—Two wells being drilled by Mountain Fuel Supply Co. on the Church Buttes structure, Uinta and Sweetwater counties, Wyoming, where a major discovery was made last spring at a total depth of 12,894 ft., are at a critical stage. No. 2 Unit NE NE NE 22-17n-112w, 5 miles northeast of the discovery, is drilling below 11,500 ft., and 3 Unit NE SW NE 12-16n-113w, 1½ miles west of the discovery, is drilling below 11,300 ft. Contract depth of 11,000 ft. for both wells with the Rocky Mountain Drilling Co. has been completed, and drilling is now on a footage basis. Since reaching contract depth, the formations are being cored practically all the way down. The discovery well, 1 Unit, SW NW 8-16-112, was completed in the Dakota through perforations at 12,550-12,650 ft., and open 3½ hours flowed gas at the rate of 28,633,000 cu. ft. per day and about 150 bbl. of 50.5° gravity distillate through a ⅞-in. choke. Both of the outposts have been unofficially reported to be running higher on structure than the discovery.

Montana deep tests.—Texas Co. 1 Bowdoin Unit SW SW 8-32n-32e, Bowdoin Dome, Phillips County, Montana, first of three tests to be drilled on that structure, is drilling at 5,583 ft., probably in the Ordovician and near the top of the Cambrian. It had the top of the Devonian at 4,000 ft., and has cut some good sands, but these showed only water. Same company's 1 Sorrell NE NW 29-36n-6e, Keith district, Liberty County, had the Devonian at 3,775 ft., and is drilling at 4,856 ft. It had some shows of gas in the Devonian, but these amounted to little more than bubbles.

Wilson Creek changes operators.—The California Co. will become unit operator for the Wilson Creek field, Rio Blanco County, Colorado, on February 28. The company is opening an office at Craig, from which operations will be directed. The Texas Co. has been the operator for the past 10 years. The two companies are joint owners, and contract provides an option under which either party may elect to be the operator at the expiration of 5-year periods, and under it Texas Co. may again exercise its option in 1952.

New operations.—New operations were down to two, one in Kevin-Sunburst and one in Cedar Creek, both in Montana.

Completions.—Eleven wells were completed, of which 6 were oil wells, 4 were gas wells and 1 was a dry hole. Five of the oil wells were in Wyoming, and one in the Kevin-Sunburst field in Montana. The gas wells included one each in Cut Bank, Cedar Creek, and Bowdoin, in Montana, and Fulcher Basin, New Mexico. The dry hole was in the Worland field in Wyoming.

WYOMING SUCCESSFUL WILDCAT

Neiber Dome, Washakie County: G. & G. Drilling Co. 1 Government SE NE NW 19-45n-92w. TD 10,980 ft., plugged back to 10,189 ft. and completed in Embar through perf. at 10,070-95 and 10,025-55 ft., flowed 281 bbl. 42° gravity oil in 9 hours through ¾-in. choke. Top Embar 10,025 ft; Tensleep 10,270 ft.; Madison 10,736 ft.

KANSAS

Kiowa County May Get First Oil

THE first commercial oil production in Kiowa County may be found in Stanolind Oil & Gas 1 Sealy, NW NW NW 25-30s-18w. After drilling 60 ft. into the Arbuckle to total depth of 5,795 ft., the test was plugged back and pipe was perforated at 5,110-35 ft., or 40 to 75 ft. in the Mississippi. Following acid treatment of 2,000 gal., the well swabbed 6 bbl. of 33°-gravity oil and 5 bbl. of water per hour for 2 hours. Formation tops are: Lansing 4,415 ft., Mississippi lime 5,070 ft., Misener 5,380 ft., Viola 5,384 ft., Simpson shale 5,600 ft., Simpson sand 5,640 ft., and Arbuckle 5,735 ft.

Ellis County has two big wells on the west side of the Burnett pool. Continental Oil Co. 1 Watkins, NW SW NW 2-11s-18w, swabbed 400 bbl. of oil in 3¾ hours from the Arbuckle at 3,598-3,610 ft. Shell Oil Co. 1 Ridler "E," SW NW NW 2-11s-18w, swabbed 97 bbl. of oil in 1 hour from the

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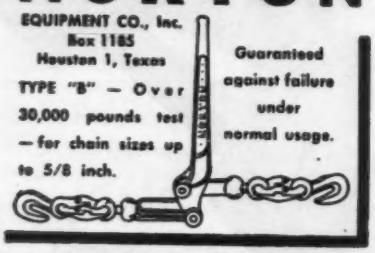

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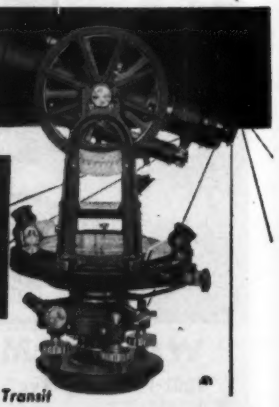

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Arbuckle at 3,570-75 ft., after a fill-up of 3,000 ft. of oil in 4 hours.

Current activity is confined almost entirely to recently discovered new pools and to inside locations in old fields. Out of 43 new locations for the current week, there are but two wildcat locations. Gas wells in the Hugoton area accounted for 20 of the state's total of 58 completions for last week.

KANSAS SUCCESSFUL WILDCAT

Rice County: Drillers Gas 1 Dinsmore, SW SW NE 36-19s-9w, recompleted well, produced 2,500,000 cu. ft. gas from sand at 1,970-85 ft., TD 3,293 ft.

KANSAS WILDCAT FAILURES

Barton County: Helmerich & Payne et al 1 Davis, NW NW SW 32-16s-14w, dry, TD 3,719 ft., anhydrite 615 ft., Lansing-Kansas City 3,206 ft., conglomerate 3,447 ft., Arbuckle 3,468 ft., Regan 3,695 ft., granite 3,718 ft.

Graham County: Derby et al 1 Swenson, SW SW SW 8-9s-21w, dry, TD 3,934 ft., Heebner 3,443 ft., Lansing-Kansas City 3,486 ft., Basal Kansas City 3,716 ft., conglomerate 3,785 ft., Arbuckle 3,880 ft.

Rooks County: Royer & Farris 1 Eggleston, NE NE NE 33-10s-18w, dry, TD 3,670 ft., anhydrite 1,360 ft., Lansing-Kansas City 3,304 ft., Basal Kansas City 3,492 ft., cherty conglomerate 3,525 ft., Simpson 3,614 ft., Arbuckle 3,620 ft.

Sumner County: George F. Johnston 1 Brandenburg, NE SE NE 36-31s-2w, dry, TD 3,788 ft., Mississippi lime 3,750 ft. with a stain of oil, dolomite 3,760 ft.

ILLINOIS

Effingham County Test Looks Promising

MATTOON. — NuEnamel Corp.-Gilliam-Aspin 1 Adams, SW NW SE 10-6n-7e, Effingham County, had 180 ft. of clean oil, 60 ft. of mud, and no water on a 1-hour drill-stem test in the Rosiclare at 2,835-45 ft. The well is located 10 miles southeast of Effingham and 2 miles northwest of the Bible Grove pool. Formations reported are: Upper Paint Creek 2,652 ft., Benoist 2,707 ft., Aux Vases 2,813 ft., Ste. Genevieve 2,828 ft., and Rosiclare 2,838 ft. Core from the Rosiclare at 2,840-45 ft. recovered 4 ft. of medium soft formation. The test is drilling ahead at 2,850 ft.

Illinois completions for the current week include six wildcats, three dry and three producers. There were 33 field well completions, 11 dry and 22 producers. Producing wells account for 1,872 bbl. of new production. First reports total 25, 5 of which are wildcats.

ILLINOIS SUCCESSFUL WILDCATS

Clay County: Phillips Petroleum Corp. 1 Spiker, NE SE SW 23-3n-5e, 5-in. at 2,588 ft., TD 3,058 ft., PB to 2,608 ft. Shot 30 qts. 2,595-2,608 ft., pumped 95 bbl. oil per day from Cypress 2,585-2,614 ft., Ste. Genevieve 2,852 ft.

Marion County: National Associated 1 Baye, NW NE NW 21-4n-4e, 7-in. at 2,197 ft., shot 10 qts. 2,205-10 ft., TD 2,210 ft., IP 38 bbl. oil per day, Benoist 2,130-35 ft., Aux Vases 2,199 ft.

White County: Pure Oil Co. 1 Husk SE SE NE 20-5s-9e, 5-in. at 3,193 ft., TD 3,352 ft., PB to 3,298 ft., shot 65 qts. 3,199-3,210 ft., initial production 6 bbl.; Aux Vases, 3,194 ft., Rosiclare 3,288 ft., McClosky 3,321 ft.

ILLINOIS WILDCAT FAILURES

Effingham County: George McDevitte et al 1 Campbell, NE SW SE 10-6n-5e, dry, TD 2,520 ft.; Ste. Genevieve 2,464 ft., McClosky 2,492 ft.

Madison County: Ray Lewis 1 Heinrick, NE NE NW 35-5n-5w, TD 601 ft., no tops, abandoned wildcat.

Wayne County: National Associated Oil Co. 1 Henson, SE SE SW 22-2n-5e, dry, TD 3,030 ft., Ste. Genevieve 2,941 ft., McClosky 2,954 ft.

WATCHING WASHINGTON

(Continued from page 48)

John R. Steelman, assistant to the President, permits the War Department to continue producing fertilizer until its commitments have been fulfilled, which will be next October or November, but it has been scaled down from 88,000 to 65,000 tons of ammonium nitrate per month. The Army is being held to 385 pressure tank cars for shipment of anhydrous ammonia and will soon obtain 22 more now leased to the chemical industry, but the inference is that it will not be permitted to secure any pressure tank cars above that total.

"The liquefied petroleum-gas industry," the announcement said, "will be permitted to add as many tank cars as it can obtain from new production to its operating fleet during the remaining months of peak demand."

Presumably this means that all new pressure tank cars will be allocated to L.P.G. service. During recent months the production of new cars has been divided between L.P.G. and anhydrous ammonia services. During January L.P.G. shippers obtained 778 new pressure cars and were supposed to get 121 in February, but delays in construction will limit deliveries to about 100.

The cutback was ordered chiefly because of the serious effects on the domestic-fertilizer industry threatened by the Army program of exporting nitrogenous fertilizer to occupied areas, but it was also recognized that the program was taking an unwarranted share of the pressure tank cars in the country. The White House announcement explained that the fertilizer is being made in scattered ammunition plants, requiring the use of pressure tank cars to ship anhydrous ammonia long distances to be converted into ammonium nitrate, which must then be shipped in low-pressure tank cars to other plants for conversion into finished fertilizer.

When the program started last October the Army attempted to obtain all government-owned tank cars which had been leased to L.P.G. and other industries during the war or offered for sale as surplus following the war. It was expected that industrial users would be able to obtain delivery of new cars to meet their needs, but production lagged due to the shortage of steel and the increased demands for liquefied petroleum gas and other chemicals requiring pressure cars. The Office of Defense Transportation ordered that 265 cars from the petroleum fleet be turned over to the Army for ammonia use and attempted to meet the deficiency by requiring more efficient use and elimination of crosshauls. These measures, however, failed to meet the objective, and in ordering a reduction in the fertilizer program Steelman said:

"The shortage of high-pressure tank cars has been felt severely by the liquefied petroleum-gas industry. Although this industry has 2,612 high-pressure cars now in service—476 more than it used during the peak war years—it has not been able to keep abreast of expanding demands for bottled gas.

"In addition, several hundred more high-pressure tank cars are urgently needed to support expanding chlorine and alkali production. Facilities which have been idle since VJ Day will resume operations, starting in May, to produce these chemicals which are critically short in industry.

"The needs of all the various users of tank cars were carefully balanced against the imperative need to meet the domestic and military demands for fertilizer. None of these demands could be met in full.

"The point has now been reached when it is felt that any further withdrawals of tank cars to permit the War Department to meet its fertilizer-production schedules will impose serious and unjustified hardship upon other segments of the economy."

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Among the Drilling Contractors

Shaw Petroleums of Lloydminster are drilling Dalo 1, LSD 1, 35-49-1w4 in the Alberta section of the Lloydminster field, Canada.

Harry I. Morgan is drilling contractor on the Richard W. Norton, Jr., et al 1 Etheridge, in Section 12-9n-12w, Sabine Parish, Louisiana. The test is contracted for 6,000 ft. Location is 6 miles southwest of Pleasant Hill.

Ben Brack is drilling contractor on the Anderson Prichard Oil Corp. and J. M. Huber Corp. 1 Sylvester, in NE NW SW 35-31-1w, Sumner County, Kansas. The test is 2 miles north of the town of Wellington and is 1½ miles east of production in the Wellington pool.

Mohawk Drilling Co. has started operations at a new test in Pawnee County, Oklahoma. The wildcat is 2½ miles south of the Watchorn pool, in SW SW NE 20-22n-3e, and will go to the Wilcox sand.

Meredith, Clegg & Hunt, Houston, are building derrick and moving in tools to drill 2 Hebert Trust et al for Fidelity Oil & Royalty Co. and Magnolia Petroleum Co., in Jefferson County, Texas, located approximately 1 mile southeast of the Seabreeze field in Chambers County. Contract depth is 10,500 ft.

Gutowsky Brothers tools will be used to drill the Ace Gutowsky 1 Hunt, in NE NE NW 29-13n-1w, west of Jones, in eastern Oklahoma County, Oklahoma.

Ray-Harris Drilling Co., Dallas and Midland, will drill Sun Oil Co. 1 H. H. Jameson, a ¼-mile west offset to the pool discovery well, the Sun's third test in the Jameson field, Coke County, West Texas. Walter Tucker, formerly tool pusher for Loffland Brothers, Tulsa, will be in charge of operations. Ray-Harris, a newly formed company, is headed by G. F. and Harlan Ray, Dallas independents, and Dave R. Harris, formerly drilling superintendent for Schoenfeld-Hunter-Kitch Drilling Co., Tulsa.

Williams-Copeland Drilling Co. will drill a wildcat in Noble County, Oklahoma, for Mazda Oil Co. and Gulf Oil Corp. The test is the 1 Betty Hon, in NE NE SW 34-24n-1e, 3 miles north of the town of Red Rock. It will be carried to the Wilcox zone but will investigate the Bartlesville and other sands which produce in the Tonkawa field.

Herco Oil Shooting & Contracting Co. has taken over all testing operations at Alliance 1, LSD 15, 19-20-1w4 in the Antelope Hills area of eastern Alberta, close to the Saskatchewan boundary, in return for a one-third gross interest in the well, now standing at 3,930 ft. Operations will start within a few weeks under supervision of Haskell N. Green, Whittier, Calif.

Harbar Drilling Co. and Paul Hatfield have started drilling operations at their 1 Keller, in SE NE NE 7-28-12, a wildcat test 5 miles north of the

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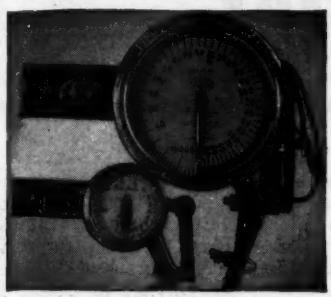

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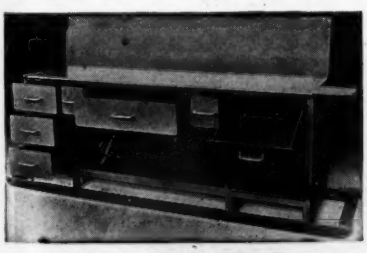

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HOUSTON TEXAS

Chitwood pool in Pratt County, Kansas. Supporting the test are Tide Water Associated Oil Co. and Gulf Oil Corp.

Virgil Wilkinson, Shawnee, Okla., has staked location for Erosion Exploration Co. 1 Will Rhoten, in Block 44, T&P Survey, 6 miles northwest of Springtown, Wise County, North Central Texas. It is to be a 2,000-ft. rotary test.

Virginia Drilling Co. has started operations at the 1 Blount, in SE SE SW 35-21-12, Stafford County, Kansas.

Parker Drilling Co. has the contract on the Republic Natural Gas Co. 1 Lawrence Harmon estate, in SE SW SE 8-1n-2w, ½ mile north and one location east of the Eola field discovery well in southern Garvin County, Oklahoma. Contract is to the Bromide or 10,100 ft.

Western Drilling Co., Longview, Tex., has contracts for two rotary tests in the Page field extension of Schleicher County, West Texas. George D. Morgan, trustee, 1-C Koy was moving in rotary after setting surface pipe, and Cooper Gas Co. 2-E Bert Page was drilling below 1,540 ft. in limestone.

Stickle Drilling Co. and **Sunray Oil Corp.** are rigging up rotary tools for the 1 Morrison, in NW NW NW 29-16-15, Barton County, Kansas. The wildcat test is located in the northwest corner of the county, 4 miles southeast of the Winget pool of Rush County.

Morris-Meredith Drilling Co. had the drilling contract on the Sohio Petroleum Corp. 2 Farmers Land & Coal Co., in Section 26-10s-7w, Calcasieu Parish, Louisiana. The well, which opened a new oil field in the parish, was drilled to 10,874 ft., plugged back and set pipe and perforated at 10,354-62 ft.

Westlund & Johnson, Inc., Midland, Tex., was drilling ahead at Ray Albaugh's 1 J. E. Dorsey, a 4,350-ft. rotary wildcat in northern Dawson County, West Texas. Location is 3 miles south of O'Donnell, in the T&P Survey.

Holm Drilling Co. and Flynn Oil Co. have staked location for the 1 Mayer, wildcat test in NW NW NE 9-22-8, Reno County, Kansas. This is the first test of the year for Reno County. It is 4 miles south of the town of Sterling.

Cox Drilling Co. has completed at its 1 Lee Easter, in the A. Benton Survey A-37, 2½ miles northeast of Jermyn, in Jack County, Texas, for 206 bbl. of oil in 12 hours. It had pay zone at 3,199 to 3,206 ft., total depth.

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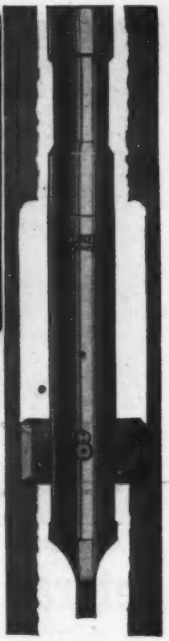

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PERSONALS

Veteran Executive Heads Refineries Of Ohio Oil

TWENTY-THREE years of service in an executive capacity with Ohio Oil Co. have qualified Ray E. Luton for his new position as manager of refineries for the company.

Luton joined Ohio in 1924 as assistant superintendent and chemist at the Robinson, Wyo., refinery when Ohio acquired Lincoln Oil Refining Co. He was named general superintendent of refineries in 1935 when Lincoln was dissolved and remained in that capacity until his new duties were created in a revamping program within the refining and marketing division.

Well recognized in national refining circles, Luton is a member of the board of trustees of the Western Petroleum Refiners Association and the Twenty-Five Year Club of the American Petroleum Institute, and a member of the American Society for Testing Materials.

During World War II, he served on several committees appointed within the petroleum-refining industry to aid the war effort.

Baird H. Markham, director of the American Petroleum Industries Committee, has been reelected vice chairman of the Administrative Committee of the National Highway Users Conference.

C. A. Johnson has been elected president of the Independent Refiners Association of California. Other new officers are **D. B. O'Neill,** vice president and general manager; **M. M. McCallen,** vice president; and **Clifford Hancock,** secretary-treasurer. Directors are **B. E. Devere, D. S. Fletcher, W. G. Krieger,** and **J. D. Sterling.**

Kenneth A. Henderson has been elected a vice president and treasurer of Imperial Oil, Ltd.

Ralph K. Davies, former deputy administrator of the Petroleum Administration for War and former vice president of Standard Oil Co. of California, together with Robert L. Smith, Los Angeles, have bought Script, a Pacific Coast magazine, and will assume publication of the magazine April 1, according to an announcement by Mrs. Bob Wagner, publisher.

Thomas E. McCabe has been promoted to foreman in the lube-oil-treating plant of the Bayonne refinery of Standard Oil Co. of New Jersey. **William E. Kreiss** has been named foreman in the No. 2 plant.

Alexander Deussen, well-known Houston geologist, will receive the Sidney Powers medal "for outstanding and distinguished contributions to the American oil industry" at the annual convention of the American Association of Petroleum Geologists March 24-27 in Los Angeles.

J. Gordon Russell, formerly petroleum engineer with Stanolind Oil & Gas Co. at Odessa, Tex., has resigned to join the engineering staff of Creole Petroleum Corp. in Maracaibo, Venezuela.

E. L. Downing, assistant superintendent of the Gulf Coast division, producing department, Magnolia Petroleum Co., will be transferred to Dallas as assistant general superintendent of production, effective March 1. **F. R. Corbell** will succeed Downing at Houston as superintendent of the Gulf Coast division; **C. E. Taylor** will be transferred to Alice, Tex., as superintendent of the Alice district, succeeding Corbell, and **Harvey Lee** will succeed Taylor at Brownfield, Tex., as superintendent of the Brownfield district.

Max W. Ball, director of the Oil and Gas Division of the Department of the Interior, last week was admitted to practice before the U. S. Supreme Court. Ball has been a member of the bar of the District of Columbia since 1914.

C. Taylor Cole, Midland, Tex., oil operator and consulting geologist, was elected president of the International Junior Chamber of Commerce at the world congress held last week in Dallas.

George A. Schumann has been appointed foreman in charge of bulk receiving and shipping at the Baltimore refinery of Standard Oil Co. of New Jersey.

M. T. Smith has been promoted to crude-oil representative for Shell Oil Co., Inc., in the Midland, Tex., area, covering West Texas and New Mexico.

A. V. Bourque has joined the Fred Eldean Organization, New York, which has been retained in connection with the public-relations program of the petroleum industry. Bourque served during the war with the Office of Defense Transportation. He was formerly secretary of the Natural Gasoline Association of America and later of the Western Petroleum Refiners Association.

J. L. Latimer (right), president, Magnolia Petroleum Co., Dallas, presents M. J. Norrell, manager of the industrial-relations department and acting secretary prior to his recent retirement, with a plaque expressing the appreciation of the company's board of directors. Norrell joined Magnolia Petroleum in 1930, and was the first manager of its industrial-relations department

R. J. Tibbets has been elected vice president of Sinclair Refining Co., pipe-line department, to succeed **M. E. Fannon** who has been granted an indefinite leave of absence because of ill health. Tibbets, formerly assistant general superintendent at Kansas City, Mo., is now located at company headquarters at Independence, Kans.

Carl H. Gompf has been named assistant manager of the pipe-line department of Ohio Oil Co. **D. J. Griffin,** of the Casper, Wyo., division, has been appointed an assistant secretary of the company.

Don R. Ryan, head of the Casper, Wyo., crude-purchasing department of Standard Oil Co. (Ind.) has assumed jurisdiction of the Colorado area. The Denver purchasing office recently was closed.

Floyd L. Miller has been named director of the research division of Esso Laboratories, succeeding **E. Duer Reeves,** recently elected a vice president of Standard Oil Development Co. In the chemical division, **Charles E. Morrell** has been appointed associate director, succeeding **William J. Sparks,** now director, and **Miller W. Swaney** has been named assistant director.

L. T. POTTER

L. T. Potter has been appointed assistant to the president of Lone Star Gas Co. He has been superintendent of production and assistant general superintendent of the company's transmission division. He has been with Lone Star more than 18 years. He was named chief production engineer in 1939 and production superintendent in 1941. In 1945 he was assigned additional duties as assistant general superintendent of the company under **Julian L. Foster,** general superintendent. Other promotions announced by the company include: **Thomas S. Bacon,** from research engineer to chief engineer; **Richard A. Minter,** from office engineer to assistant chief engineer; **Edgar A. Brown,** from chief production engineer to superintendent of production.

Dr. C. L. Brown has joined Standard Oil Development Co. as coordinator of work in the chemical field and of all exploratory research. He formerly was director of the Esso Laboratories of Standard Oil Co. of New Jersey, Louisiana Division.

George H. Clark, who has been with The Texas Co. since 1929, has been promoted to division geologist of the South Texas division, producing department, effective March 1. Clark will succeed **John C. Miller,** division geologist 14 years, who resigned to accept a similar position with Jergens Oil Co.

Harry Chandler, assistant to the chief clerk of the North Texas production department of Gulf Oil Corp., has been transferred to Crane, Tex.

Bradley Murray, whose appointment as consultant to the Oil and Gas Division of the Department of the Interior was announced last week, formerly was a member of the organizational planning staff of the Petroleum Administration for War and later served as director general of finance in Iran. He entered the oil business in 1934 as an accountant for Danciger Oil & Refining Co. and 8 years later held the post of assistant to the president, later serving as general manager of the refining division.

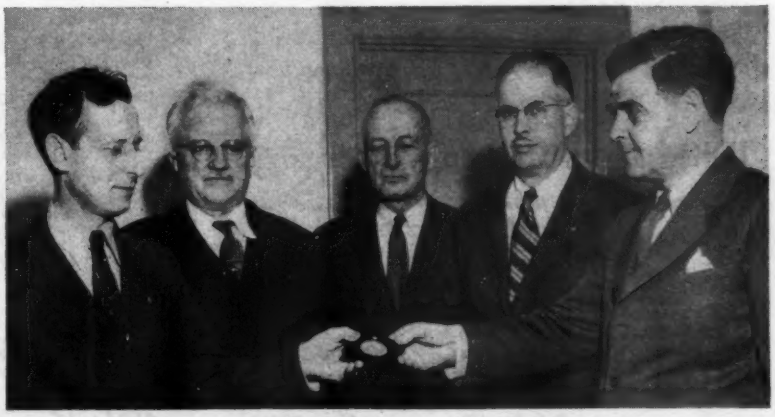
L. F. Peterson, New Mexico division petroleum engineer with Stanolind Oil & Gas Co., has been transferred to Tulsa as chief petroleum engineering supervisor. He is being succeeded in Fort Worth by **Lewis Finch, Jr.**

SHIFTS:

Frank Hunt, foreman, Sunray Oil Corp., Whiteface, Tex., to Odessa, Tex.; **J. S. Detweiler,** engineer, California Research Corp., San Pedro, Calif., to Colma, Calif.; **Charles M. Tarr,** engineer, Continental Oil Co., Ventura, Calif., to Long Beach, Calif.; **H. C. Talley,** engineer, The Texas Co., Clayton, N. M., to Boise City, Okla.; **C. M. Barrington,** superintendent, Albert M. Adkisson, Santa Anna, Tex., to Coleman, Tex.

P. A. Kindsvater, engineer, British American Oil Producing Co., Seymour, Tex., to Houston; **Irvin B. Murray, Jr.,** engineer, McCarthy Oil & Gas Co., Stephenville, Tex., to Abilene, Tex.; **C. G. Swank,** superintendent, Humble Oil & Refining Co., Conroe, Tex., to Thompson, Tex.; **Joe J. Travis,** geologist, Barnsdall Oil Co., Houston to Corpus Christi; **Albert S. Trube, Jr.,** engineer, Tide Water Associated Oil Co., Kilgore, Tex., to Houston; **K. A. Mygdal,** geologist, Pure Oil Co., Midland, Tex., to Fort Worth.

C. W. Guthrey, foreman, Union Sulphur Co., Inc., Welsh, La., to Iowa, La.; **Frank H. Miller,** engineer, Big West Drilling Co., Shreveport, to Albany, Tex.; **Robert W. Matthews,** engineer, Carter Oil Co., Effingham, Ill., to Havre de Grace, Md.; **Roland C. Nyquist,** engineer, Shell Oil Co., Inc., Alton, Ill., to Wood River, Ill.; **Lester Johnson,** foreman, Sinclair Refining Co., Hammond, Ind., to Cleveland, Ohio; **Hugh A. Kobel,** superintendent, Crystal Refining Co., Carson City, Mich., to Mt. Pleasant, Mich.; **O. C. Johnson,** engineer, Socony-Vacuum Oil Co., Inc., Augusta, Kans., to East St. Louis, Ill.; **James S. Hopkins,** foreman, Amerada Petroleum Co., Buffalo, Wyo., to Ardmore, Okla.; **D. D. Moore,** geologist, Seismic Explorations, Inc., Anadarko, Okla., to Cordell, Okla.; **Alvin E. Hall,** engineer, Phillips Petroleum Co., Pawhuska, Okla., to Odessa, Tex.



For saving the life of Carl T. Humphrey by artificial respiration, Nels J. Kirk, tester in Continental Oil Co.'s Ponca City refinery, received the President's Award of the National Safety Council, February 19 in Ponca City. Kirk was present at a social function in Ponca City last November when Humphrey suffered a heart attack. He revived Kirk after administering artificial respiration for 15 minutes. At the presentation ceremony above are Kirk, Dr. Walter Miller, retired Continental vice president; J. S. Boylan, safety superintendent; Humphrey, and Harold G. Osborn, Continental vice president who made the award. Kirk, who joined Continental in 1926, has long been active in safety work, having taught artificial respiration to more than 500 workers at the Ponca City refinery

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Equipment Men in the News

Dr. Penso Transamerican Representative

V. PENSO deLEON

Victor E. Milch, resident partner in the United States, of Transamerican Factors, Ltd., with headquarters in Los Angeles, has announced the appointment of Dr. Virgilio Penso deLeon, as representative for the United States and Venezuela, and will be in charge of their office at "El Conde" Este 10, No. 162, Caracas, Venezuela.

Smith Export Representative For Atlas Production

Appointment of Roland E. Smith as exclusive export representative for Hi-Perm, an oil-well cleaning chemical, is announced by J. Paul Sievers, president, Atlas Production, Inc. Smith will handle all foreign sales of the product, assisted by Knight C. Templeton, from their office at 617 South Olive Street, Los Angeles. A 4-month trip to all oil-producing countries of South and Central America is planned by Smith at the end of February.

Southwest Machinery Opens New Plant

Southwest Machinery Co., distributor of Caterpillar equipment, road and construction machinery, and oil-field supplies, have opened a new home at 1900 Linwood Boulevard, Oklahoma City. The new plant including shop, parts department, stock room, show room, storage and offices, contains 41,030 sq. ft. of concrete floor space under roof and 29,330 sq. ft. of concrete space not roofed. The company was organized in 1941 to succeed Oklahoma Tractor & Equipment Co. which had served the Oklahoma territory since 1927. Company officials are R. L. Hoover, president and general manager; A. L. Robertson, vice president-treasurer, in charge of sales; E. A. Butler, vice president, in charge of parts and service, and W. F. McCormick, vice president and general manager at Tulsa. Dan Griffin is manager of the engine division.

Vincent Made Service Chief in Magcobar

W. L. "Billy" Vincent, former field-service engineer for Magnet Cove Barium Corp. in Southwest Louisiana, has been promoted to the position of chief service engineer effective January 15. In his new position, Vincent will have supervision over all mud engineers and field-service men. He will be stationed at the company's general sales offices in Houston. John Hebert has been appointed to succeed Vincent in Louisiana and will make his headquarters in Lake Charles.

Cutler-Hammer Announces New Appointments

Cutler-Hammer, Inc., Milwaukee, has just announced the following changes in the company's executive organizational group: J. C. Springer has been elected treasurer. Springer is also assistant secretary. J. C. Borden has been appointed comptroller. B. M. Horter is now director of purchases. Rex Davies has been appointed manager, credit and collection department. H. F. Vogt, who has resigned as vice president and treasurer, continues as chairman of the executive committee comprising Vogt, F. R. Bacon, chairman of the board, and G. S. Crane, president.

Guyod Speaks in Dallas

Hubert Guyod, Houston well-logging consultant, recently spoke before the Dallas Petroleum Engineers Club on "Interpretation of Electric Logs in Limestone."

Flenniken Joins Manning

W. W. (Bill) Flenniken, former sales manager and director of advertising for the Halliburton Oil Well Cementing Co., has resigned effective February 1, to join Fred M. Manning, Inc., Denver, as general manager of operations. The Manning organization, drilling contractors in the Rocky Mountain area, also has production in Kansas, Oklahoma, and Texas.

Wickwire Spencer Appoints Black

John F. Black has been appointed general superintendent of the Buffalo plant of Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corp., Denver. Black has been director-at-large of the Association of Iron and Steel Engineers during 1946, and will act as secretary in 1947.

Adrian D. Bolland (left), and T. G. Martin "on the sidewalks of Buenos Aires." Bolland has recently been appointed Argentina agent for R. J. Eiche, general export agent for Cavins Co., Eastman Oil Well Survey Co., Hamer Oil Tool Co., and Web Wilson Oil Tools, Inc. Martin, who has been associated with R. J. Eiche for the past 10 years, recently returned from a 6-month tour of the oil fields of South America.

American Locomotive Appoints Brown

HOLMES BROWN

Appointment of Holmes Brown as director of public relations of the American Locomotive Co. is announced by President Robert B. McColl. He succeeds Lynn Mahan, who has resigned to form his own public relations organization. In his new assignment Brown will supervise all advertising, sales promotion, and publicity activities. George Mason was appointed assistant director of public relations. He is also director of information. Brown has been associated with American Locomotive since October 1945, when he became director of advertising and sales promotion. Previously he was advertising manager of the Pennsylvania Rubber Co., Jeannette, Pa., and prior to that, was associated with the General Electric Co.

Two New Houston Companies Chartered

Dickson Drilling Corp., oil-well drilling contractors, and Smith-Yancy Corp., manufacturers of oil tools and drilling equipment, both firms of Houston, have been chartered by the state of Texas. Dickson corporation is capitalized at $30,000, the Smith-Yancy Corp. at $50,000. Dickson corporation has offices in the Sterling Building, the Smith-Yancy Corporation plant is at 3820 Winchester. Incorporators of the Dickson firm are W. A. Dickson, H. W. Wright, and Inez Lee Dickson. Dickson is former drilling superintendent for Noble Drilling Corp. Wright was toolpusher under Dickson. The Smith-Yancy incorporators are Roger Smith, J. H. Yancy, and Roger Smith, Jr. The senior Smith was formerly mechanical engineer with Gray Tool Co. Yancy was mechanical engineer for the A-1 Bit & Tool Co. Smith, Jr., is a mechanical engineering student at Rice University.

Sess Named General Sales Manager

H. John Eastman, president of Eastman Oil Well Survey Co., has announced appointment of Ted W. Sess as general sales manager. His duties will include the responsibilities of general sales supervision for the Pacific Coast, Gulf Coast, Mid-Continent, and Rocky Mountain divisions of local sales management of these four divisions. Sess was formerly a sales executive of Colorado Fuel & Iron Co., and of its subsidiary, Wickwire-Spencer Steel Co.

Luscombe Names Cunningham Vice President

James P. Cunningham, vice president in charge of production for Luscombe Airplane Corp., Dallas, has been advanced to vice president of the corporation, it is announced by L. H. P. Klotz, president.

Rockwell Makes Three New Appointments

Three appointments to the executive staff of Rockwell Manufacturing Co., Pittsburgh, have been announced by W. F. Rockwell, Jr., vice president and general manager. C. A. Wiken, for the past 8 years chief engineer of the Delta Manufacturing Division in Milwaukee, has been promoted vice president in charge of engineering. J. E. Ashman has been named controller. He comes to the Rockwell organization

(Continued on page 127)

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads except Situations Wanted, 10 cents a word. Minimum charge, $2.00 per insertion.
Situations Wanted ads, 5 cents a word. Minimum charge, $1.00 per insertion.
Centered Line, any ad, 75 cents.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$9.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR CABLE TOOLS
see
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

6" HOSE, very specially priced. Oil resistant for suction and discharge. 100 Lengths, 25' each. Nipples and flanges attached. New, factory wrapped. Constructors' Equipment Company, GPO 297, New York 1, N. Y.

1 Caterpillar D-4 with Cardwell side boom. First-class condition. 1 T-D-9 International with Buchyeres Angle Dozer. New 1 Cleveland 110 Ditching Machine. First-class condition. W. B. Garner Contracting Co., Box 566, Turkey, Texas.

FOR SALE: 5,000' 4½" OD 16.60# Range 2 drill pipe with regular tool joints; 6,100' 4½" OD 16.60# Range 2 drill pipe with A.P.I. F.H. tool joints. Also 1 steel drilling rig complete with boilers and drill pipe capable of drilling 6,000'. 7 Nixon Gas Lifts complete with weights, lifts and line Wire, write or phone Louisiana Iron & Supply Co. Shreveport, La.

EQUIPMENT FOR SALE

LUMBER FOR SALE: 3x6 and wider 10 to 16 rough Oak $58.00 f.o.b. mill. E. J. Gaiennie, Lumber, Box 1074, Shreveport, Louisiana.

FOR SALE: Fort Worth "H" Spudder, steel pole with good cordage and drilling tools. Power No. 4600 Caterpillar Diesel engine. Frank F. Young, Chanute, Kansas.

FOR SALE: Reconditioned 7¼x16" Gardner-Denver, Model EXQ, Roller Bearing power-driven slush pump complete. Reasonable price. The National Supply Company, Fort Worth, Texas.

FOR SALE: Complete small refinery with catalytic cracker, pipe line gathering system and production. Will sell complete or in part. Address inquiries to Box B-559, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Pumping Units. All types & sizes. New and used. Bridgeports, Jensens, Americans, Atlas, Ideco, with or without Power. Glenn Supply Co., 3600 Sand Springs Road. Phone 3-9607, Tulsa, Okla.

FOR SALE: Model 200 Sullivan Drill mounted on 1941 tandem White truck, complete with all drilling accessories, 1800 ft. 2⅞-in. drill pipe, 5x8 Gardner-Denver pump, Kohler light plant, etc. Purchased new in May 1945. Never drilled below 1,500 ft. Price $19,500.00, FOB Grandfalls, Texas. Write Box 172 or call 82, Grandfalls, Texas.

NEW MATERIAL FOR SALE

50—4" x 25' Barge Hoses equipped with Bronze Male & Female Couplings at $35.00 each.

Several thousand Victualic Coupling Gaskets, size 4"-6"-12". 5,000 Gaskets for 8" Single Lever Type Rapid Action Coupling Pipe at 50% Discount.

6—Centrifugal Pumps, unitized, 1000 G.P.M., powered by 33-R Continental 6 Cylinder Engine at $1250.00 each.

1—Water Purification System, 80 G.P.M. with Chemicals, Accessories, Wood Tanks, Fittings, and Valves. Semi-Portable, at $2500.00.

250—5⅛" Hughes Full Hole left hand A.P.I. Tool Joints, with A.P.I. Pipe Ends, 7" O.D., 4" bore, at $10.00 each.

Wire or Write
ATLAS SUPPLY COMPANY
P.O. Box 1331 Bakersfield, Calif.

EQUIPMENT FOR SALE

FOR SALE: WAK. Waukesha engine, 180 H.P., completely overhauled. Box 1360, Phone 306. Seminole, Oklahoma.

FOR SALE: Diesel Engine powered rotary drilling rig, suitable for 5,000' drilling. Priced cheap for quick sale. Phone 306. Box 1360, Seminole, Oklahoma.

WELL DRILLING Machines, Spudders, Core drills, Standards. Complete stock cable tools. Used equipment reconditioned. Some Government surplus. Pressey & Son, Pueblo, Colorado.

FOR SALE: One Cardwell — Model R Spudder almost new, complete with tools, butane equipment and good lines. One 1945 model Autocar tandem with 11 x 24 rubber, almost new truck. One 2½ ton 6 x 6 complete with Tulsa winch & oil field bed, also new motor in truck. One T. D. 14 tractor complete with dozer & winch, this tractor in perfect condition. One low-boy trailer, good rubber. One float trailer, good rubber. One large short couple trailer for tandem truck, new rubber. One G.M.C. 1½ ton truck & trailer, 42 model, new rubber and in good condition. Telephone 237-J or Box 693. Grayville, Illinois.

1400' 16" O.D. 70# R. 1 P. E. CSG. USED FOR LINE A-1 CONDITION. LOCATED RODESSA, LOUISIANA.

ARTHUR ARNOLD
Phones 32414, 37948 P.O. Box 3003
Shreveport, Louisiana

7,000 BARREL TANKS
43' Diameter by 28' 4" High
Used, good condition, dismantled, matchmarked and available for immediate shipment from Philadelphia, Pa.

Horwitz Pipe & Supply Co.
55 North Madison
Ph. 2-9128 Tulsa, Okla.

FOR SALE

TUBES and PIPE

all types and sizes

Write, wire or phone for quotations. Also motors, machinery and kindred items.

SONKEN-GALAMBA Corporation

Kansas City, 18, Kans.

NEW GASO PUMPS

25 NEW GASO Fig. #1860, 2½" x 4½" Bore x 6" Stroke (Removable Liners 4½" in pump). Totally enclosed Duplex Power Pumps, Timkin Bearing Equipped, Side Pot Type Fluid Cylinder, Bronze Wing Guided Valves, Stainless Steel Piston Rods, Bakelite Piston Ring Packing, Complete with 28.8 PD 5-C Groove, 5-158-C V-Belts. All Weather Belt Guard, Mounted on Steel Skid. Powered with Model C36-6419 Industrial type 9-25A Chrysler 8 Cylinder Engine # 1657, 95 HP at 2400 RPM, 3¼" Bore, 4⅞" Stroke, Displacement 323.5, Complete with clutch, Penn Switch Battery & Steel Battery Box, tool box, mounted on steel skid, with spare parts, tools, connections, valves, gauges, valves & miscellaneous supplies, boxed for export—Pump Wt. 4310#, Engine Wt. 3640#, Pump Capacity—2½" Liner 900# Sq. In. 46 bbls. per hour—3½" liner 450# Sq. In. 93 bbls. per hour, 4½" liners 350# sq. in. 160 bbls. per hour at 70 RPM. Engine Rating Continuous BHP 50 HP at 1200—68 HP at 1600—77 HP at 1800—95 HP at 2400 RPM. (Note: See Gaso Fig. #1849.) Packing list and price will be forwarded on request.

H. A. McCARTHY
310 Thompson Bldg., Tulsa, Oklahoma. Phone 5-3296

FOR SALE

2—New Combustion Engineering Company Type V3M 3-Drum Marine and Industrial Type Bent Tube Boilers and Fittings, complete with the following auxiliaries:
Superheaters; desuperheaters; steel encased settings; breechings and stacks; soot blowers; oil burners; pumping, heating and strainer set; gas burners; combustion controls; air compressors; forced draft blowers and turbines; feed-water regulators.

Each boiler has full power rating 32500# and overload rating 65000# per hour. Design pressure 540 psi.; operating pressure at superheater outlet 490 psi. Temperature of steam at superheater outlet 620° F.

These boilers are in our warehouse at Jennings, Louisiana, unassembled, just as received from manufacturer. Can give immediate delivery. Price considerably below replacement cost. For further information and details write or call

The Superior Oil Company
Oil and Gas Building, Houston 2, Texas
Telephone Capitol 6131
Address Inquiries to H. R. Hansen